

STROKE MANAGEMENT:  
DYSPHAGIA SCREENING PROGRAM

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## **Abstract**

Stroke is the fourth leading cause of death in the United States and a major cause of adult disability. The formation of stroke centers to ensure that evidence-based care is provided to stroke patients has been shown to save lives. Kaua'i has the highest age-adjusted stroke mortality rate in the state, and this is believed to be caused by issues with access and quality of care. As the largest acute care facility on the island of Kaua'i and an affiliate of the Hawai'i Pacific Health (HPH), Wilcox Memorial Hospital is preparing to become certified as a primary stroke center by the Joint Commission. An important element of stroke care is the prevention and management of complications such as dysphagia and aspiration pneumonia. A literature review and synthesis revealed that a formal dysphagia screening program decreases the incidence of stroke-associated pneumonia, which in turn leads to lower mortality rates, improved quality of life and significant cost savings. An educational program was developed and implemented for nurses to learn how to safely conduct the dysphagia screening at the bedside. Evidence-based teaching and learning strategies, including the use of nurse champions, resulted in improved practice compliance and patient outcomes. The Iowa Model and Rogers' Diffusion of Innovation Model were used as conceptual models in implementing this evidence-based practice change at Wilcox Memorial Hospital.

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## **List of Abbreviations**

AACP	American College of Chest Physicians
ADL	Activities of daily living
AHA	American Heart Association
AHRQ	Agency for Healthcare Research and Quality
A&P	Anatomy and physiology
APRN	Advanced Practice Registered Nurse
ASA	American Stroke Association
ASHA	American Speech Language Hearing Association
ATS	American Thoracic Society
BJHS-DS	Barnes Jewish Hospital Stroke Dysphagia Screen
BSN	Bachelors of Science in Nursing
CAD	Coronary artery disease
CAP	Community-acquired pneumonia
CDC	Centers for Disease Control and Prevention
CE	Continuing Education
CHX	Chlorhexidine
CITI	Collaborative Institutional Training Initiative
CMS	Centers for Medicare and Medicaid Services
CPG	Clinical practice guideline
CT	Computed tomography
DOH	Department of Health

DOI	Diffusion of Innovation
DRG	Diagnosis-related group
EBP	Evidence-Based Practice
ED	Emergency department
EMR	Electronic medical record
FEES	Flexible endoscopic evaluation of swallowing
FT	Full-time
GWTG	Get With the Guideline
HAP	Hospital-acquired pneumonia
HCAHPS	Hospital Consumer Assessment of Health Providers and Systems
HCAP	Health care-associated pneumonia
HCP	Health care provider
HLC	Healthstream Learning Center
HPH	Hawai'i Pacific Health
HTN	Hypertension
ICU	Intensive care unit
IRB	Institutional review board
JCAHO	Joint Commission on Accreditation of Healthcare Organization
KCC	Kaua'i Community College
K-T Matrix	Kepner-Tregoe Decision Matrix
LOA	Leave of absence
LOC	Level of consciousness
MEd	Masters in Education

ml	milliliter
MMASA	Modified Mann Assessment of Swallowing Ability
MRI	Magnetic resonance imaging
MS	Medical-surgical
MSN	Masters of Science in Nursing
NIHSS	National Institute of Health Stroke Scale
NPO	Nil per os or nothing by mouth
NPV	Negative predictive value
PEG	Percutaneous endoscopic gastrostomy
PPV	Positive predictive value
PSC	Primary Stroke Center
QI	Quality improvement
RCT	Randomized clinical trial
RN	Registered nurse
SAP	Stroke-associated pneumonia
SIP	Scholarly inquiry project
SLP	Speech-language pathologists
SSA	Standardized swallow assessment
SST	Swallow screening tool
TIA	Transient ischemic attack
TORR-BSST	Toronto Bedside Swallow Screening Tool
UK	United Kingdom
US	United States

VAP	Ventilator associated pneumonia
VFS	Videofluoroscopy
WST	Water swallow trials
WMH	Wilcox Memorial Hospital

## **Chapter 1. Introduction**

Affecting approximately 795,000 people with costs exceeding 73 billion dollars each year, stroke is the fourth leading cause of death and a major cause of adult disability in the United States (US) (Roger et al., 2011). For the state of Hawai'i, a poll conducted in 2010 revealed that 25,600 residents were diagnosed with stroke including 1,400 in the county of Kaua'i (Hawai'i State Department of Health, 2011). Although Kaua'i County has the lowest incidence of stroke among the islands in the Hawaiian chain, it has the highest stroke age-adjusted mortality rate of 45.6 per 100,000 which far exceeds the Healthy People 2020 goal of 33.8 per 100,000 attributed to issues of access and quality of care (Hawai'i State Department of Health, 2011).

### **Background**

In a summary statement from the American Heart Association (AHA) and American Stroke Association (ASA) Brain Attack Coalition, studies have shown that improving quality of care through the development of Stroke Centers has led to better patient outcomes and cost savings (Alberts et al., 2011). Accrediting bodies, such as the Joint Commission on Accreditation of Healthcare Organization (JCAHO), have identified performance measures to ensure delivery of evidenced-based care. The JCAHO Primary Stroke Center (PSC) Certification Program recognizes health care organizations that demonstrate high levels of care based on compliance in three areas of activities that include standards, clinical practice guidelines and core performance measures for stroke (Heidenreich et al., 2011).

Wilcox Memorial Hospital (WMH), the largest acute care hospital on the island of Kaua'i and an affiliate of the Hawai'i Pacific Health (HPH) Corporation, has been in compliance with JCAHO's eight core stroke measures for the past several years, according to its Director of

Patient Safety and Quality Services (Adams, 2013). In preparation for the JCAHO certification process, the facility also needed to put into place other major elements of a PSC, such as having written care protocols to manage stroke complications that include dysphagia and aspiration pneumonia. The AHA/ASA's Get With the Guideline (GWTG) Stroke recommends assessment of swallowing before the patient begins eating, drinking or receiving oral medications since impairments of swallowing or dysphagia are associated with a high risk of pneumonia (Jauch et al., 2013).

Within the first three days of stroke onset, dysphagia is clinically present in approximately 42-67% of patients (Turner-Lawrence, Peebles, Price, Singh & Asimos, 2009). Approximately half of these patients experience aspiration, and about 1/3 of those who aspirate develop pneumonia requiring treatment (Donovan et al., 2013; Karagianis, Chivers & Karagianis, 2011). Most available data point to aspiration as the most common cause of post-stroke pneumonia (Armstrong & Mosher, 2011). It is estimated that 35% of deaths that occur after an acute stroke are caused by pneumonia since the development of this complication is associated with more than five-fold increased risk of dying (Hinchey et al. 2005; Masrur et al., 2013).

### **Significance**

Patients with stroke and dysphagia have an increased risk of death, disability, longer hospital stay and readmissions due to chest infections and poor nutritional state ( $p < 0.05$ ) (Smithard et al., 1996; Bravata, Ho, Meehan, Brass & Concato, 2007). A formal dysphagia screening protocol has been shown to significantly reduce pneumonia risk following a stroke (Edmiaston, Connor, Steger-May & Ford, 2013). Due to the absence of systematically defined standards for a valid swallow screening tool (SST), JCAHO no longer requires the use of a dysphagia screen for PSC-certification beginning in 2010. Despite this, JCAHO still

recommends compliance with the ASA/AHA GWTG stroke quality measures, which support dysphagia screening prior to oral administration of food, water or medication (Daniels, Anderson & Wilson, 2012).

The short supply of speech-language pathologists (SLP) has also brought to attention the growing need for other health care providers such as nurses and physicians to conduct bedside dysphagia screening while still reserving the full dysphagia evaluation for the SLP. Several studies have shown that initial swallow screenings can be safely carried out by other health care providers (Jauch et al., 2013). In order to avoid confusion about what role each discipline plays in accurately identifying dysphagia in stroke patients, the terms “screening” and “evaluation” must first be clearly differentiated (Westergren, 2006). “Screening” is defined by the American Speech Language Hearing Association (ASHA) as a pass/fail procedure to identify patients in need of a comprehensive swallowing “evaluation” by the SLP. Evaluation may include the use of an instrumental dysphagia study such as the videofluoroscopy (VFS) or flexible endoscopic evaluation of swallowing (FEES), which are considered to be the gold standard diagnostic tests for dysphagia (Donovan et al., 2013).

According to the AHA/ASA, an SST not only must demonstrate reliability so various people can administer the test and get comparable results (interrater reliability), it must also demonstrate validity and feasibility (Schepp, Tirschwell, Miller & Longstreth, 2012). While most SSTs used today have high sensitivity due to concerns with aspiration and increased morbidity and mortality secondary to pneumonia, specificity levels are typically low and can lead to higher numbers of false positives resulting in unnecessary delay in oral fluids, medications and nutrition. Placing a client NPO or nothing by mouth can further compromise the patient’s fragile state as this can lead to dehydration and malnutrition as well as diminished



quality of life for the patient. Furthermore, swallow screening items such as the water swallow trials (WST) will require additional time to administer and thus, may interfere with the nurse's current workflow. For these reasons, the best screening tool as suggested by research is one that is not only valid, reliable and minimally invasive but also, easy and quick to administer so it can be done immediately after admission into the acute care setting and repeated at a later time when necessary (Daniels et al., 2012).

### **Clinical Question**

The clinical question for this project was: Will a formalized dysphagia screening program at WMH increase the nurse's knowledge, skills and usage of the dysphagia screening tool and lead to positive patient outcomes? Goals for this project included: a) selection of an SST that would best suit the needs of the hospital using the Kepner-Tregoe Decision Matrix (K-T Matrix), b) implementation of a multi-disciplinary educational program to improve adherence to the dysphagia screening protocol, and c) and betterment of patient outcomes for those admitted with acute stroke at WMH. Metric and quality indicators were selected based on literature and expert opinion of the WMH quality improvement team.

### **Summary**

In response to the AHA/ASA acute stroke guidelines, most facilities have implemented locally developed SSTs for nurses. The literature review identified at least nine SSTs and as proposed by the dysphagia care experts at the International Stroke Conference in 2012, this project used the Kepner-Tregoe Decision Matrix (K-T Matrix) model to decide which valid and reliable SST would best suit the needs of WMH (Donovan et al., 2013). After selection of the HPH SST for WMH, the dysphagia screening quality improvement project proceeded with the plan to train nurses using multi-faceted strategies. Interactive education, audit and feedback and

the involvement of opinion leaders, change champions and expert consultants all played a key role in the successful achievement of outcomes (Titler, 2007).

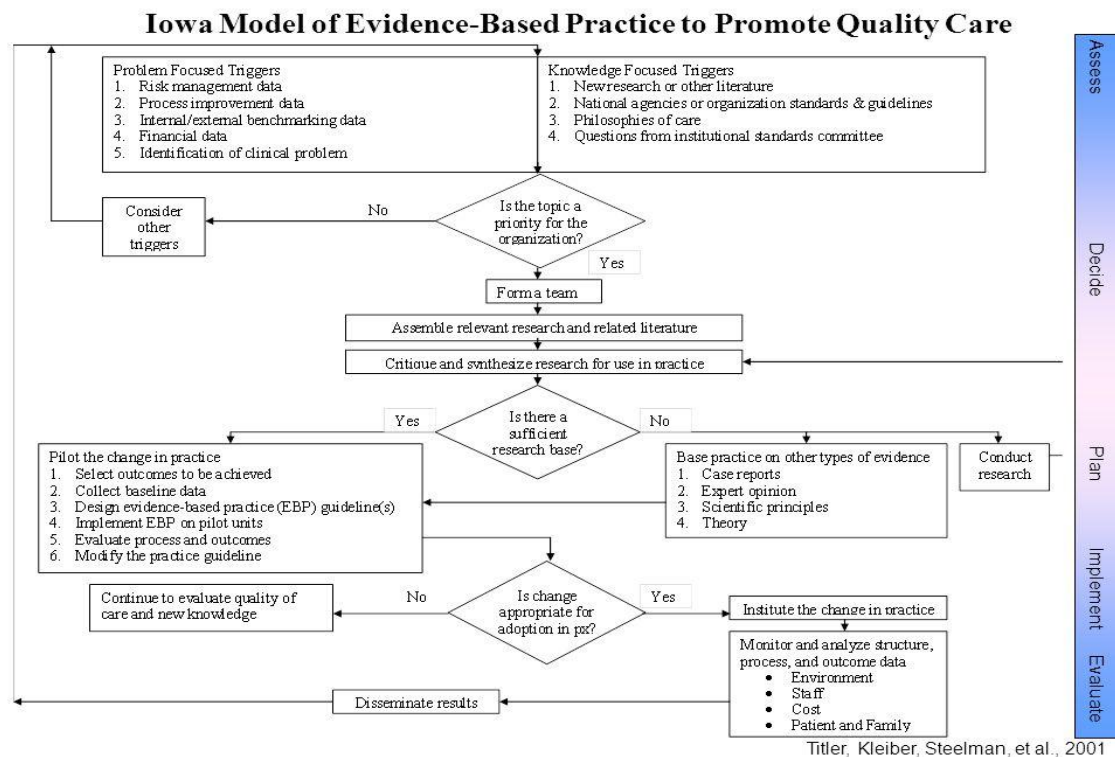
Using the framework of the Iowa Model of Evidence-Based Practice, a formalized dysphagia screening program was implemented at WMH on the island of Kaua'i. Nearly all of the nurses in the emergency department (ED), intensive care unit (ICU) and medical-surgical (MS) setting have demonstrated proficiency in knowledge and skills and expressed increased confidence in conducting swallow screening. As a result, more patients with acute stroke benefitted from the screening procedure and the incidence of aspiration pneumonia/pneumonitis declined after the adoption of the formal dysphagia screening program. The successful integration of a formalized dysphagia screening program at WMH demonstrated that nurses can develop the skills necessary to improve the care of patients with acute stroke and prevent serious complications such as aspiration pneumonia due to dysphagia.

## **Chapter 2. Problem**

### **Conceptual Framework**

The Iowa Model of Evidence-Based Practice (EBP) served as the conceptual framework for the WMH Dysphagia Screening Program. This model was developed to serve as a guide in the application of the best available evidence into clinical practice (Hall & Roussel, 2014). An essential aspect of the model is the incorporation of the EBP into organizational structures so that it becomes the standard of care (Titler et al., 2001). The Iowa Model, as shown in Figure 1, has seven steps:

1. Knowledge and Problem-Focused Triggers
2. Form a Team
3. Assemble Relevant Research and Related Literature
4. Critique and Synthesize Research for Use in Practice
5. Pilot the Evidence-Based Practice Change
6. Implement the Evidence-Based Practice Change
7. Monitor and Analyze Structure, Process, and Outcome Data



*Figure 1.*

The Iowa Model for Evidence-Based Practice (Titler et al., 2001)

**Knowledge and problem-focused triggers.** The first step in the Iowa Model is to identify triggers for practice change. A clinical problem or a risk management issue could present as problem-focused triggers while a new study finding or practice guideline may pose as knowledge-focused triggers (Titler et al., 2001). The organizational priority for WMH was to meet JCAHO's PSC requirements for certification. As a knowledge-focused trigger, the hospital needed to integrate into its system the AHA/ASA stroke care guidelines. PSC certification was developed in collaboration with the AHA/ASA to help improve the care of patients with acute stroke and is only available to programs in JCAHO-accredited acute care hospitals such as WMH (JCAHO, 2012). Reviewers with expertise in stroke care conduct an on-site visit to evaluate

standards, implementation of clinical practice guidelines and performance measurement activities. Primary Stroke Centers that successfully demonstrate compliance in all three areas are awarded certification for a two-year period but are also required to participate in a conference call at the end of the first year to review performance improvement activities and provide evidence of its continued compliance with the standards (JCAHO, 2012).

With its high age-adjusted stroke mortality rate that exceeds the Healthy People 2020 benchmark, the island of Kaua'i needed a PSC to improve access and quality of care for patients with acute stroke. Medical complications such as dysphagia and aspiration pneumonia lead to increased morbidity and mortality as well as health care costs. WMH lacked written care protocols to help guide nurses in the prevention and management of these complications. Despite AHA/ASA's recommendation for universal screening of swallowing function for all patients with acute stroke prior to oral intake, WMH was yet to develop and implement a formal dysphagia screening program.

Prior to establishing an evidence-based, structured and nurse-administered dysphagia screening program at WMH, screening for difficulty swallowing in stroke patients was conducted in a non-standardized fashion by physicians and nurses. The hospital only has one SLP, who also serves as manager for the rehabilitation, respiratory and social services. Consequently, the SLP must often rely on nurses and physicians to screen for those in need of a more in-depth SLP swallowing evaluation. Although swallowing screening is important at all levels of risk, current data suggest that patients are selectively screened based on stroke severity. Masrur et al.'s study (2013) showed that dysphagia screening did not occur in 31.1% of eligible patients while increased screening occurred in those with more severe strokes. Taking into account that pneumonia rate for unscreened patients was at 4.2% while those who were screened

and passed were at 2%, universal screening for dysphagia should become standard care (Lakshminarayan et al., 2010).

Having a formal dysphagia screening program helps decrease the incidence of pneumonia as shown in a study conducted by Hinchey et al. (2005). The study revealed pneumonia rate at sites with a formal dysphagia screening program to be lower at 2.4% than at sites with no formal screen at 5.4% ( $p=0.0016$ ). Health care provider's adherence rate with universal screening was also higher at 78% compared to 57% at sites with no formal screen. A formal dysphagia screen was defined as a check sheet listing risk factors for aspiration followed by a water challenge if client does not exhibit the risk factors. Further evaluation by a speech pathologist is conducted if the client failed the screen and placed on NPO status (Hinchey et al., 2005).

A nurse-administered SST has been incorporated into the hospital's electronic medical record (EMR) admission database since July 2013 as part of the nutritional screening of patients in the ED. The SST was first developed by SLPs at HPH in 2011 and has been in used in the ED and acute floors at Pali Momi Hospital since 2012 (Nakanishi, 2014). As a problem-focused trigger for the WMH project, the SST was underutilized because the nursing staff at WMH have not yet received any formalized in-service or training to ensure that they are aware of why, when, and how to use the SST.

Swallow screening in the ED is believed to be most appropriate since this is the first point of patient contact (Daniels, Anderson & Petersen, 2013). The ED, however, is an extremely busy unit with nurses responsible for multiple care processes in the stroke work-up. Conducting an SST will add to the nurses' responsibilities and potentially disrupt workflow. This will make it very challenging for the nurses in ED to complete the screening. Nurses working in the acute inpatient departments, such as ICU and medical-surgical floors, could be

trained to carry out swallow screenings since they also admit patients from the ED. Having multiple checkpoints during the course of the patient's hospital stay helps ensure patients are screened for dysphagia prior to oral intake. Moreover, the EPIC admission data base where the SST was located was only one of numerous places in the EMR where an SST flow sheet can be appropriately placed since changes in neurological status can occur at any time during hospitalization and would require repeated screenings. Due to these considerations, all of the nurses who provide direct care to patients with acute stroke were trained on how to use the SST. Plans for this process improvement project included having system-wide training at WMH and having SSTs be accessible to providers not only in the EPIC admission data base but also in the inpatient care progress notes and flow sheets.

Since dysphagia screening is performed only on a selected number of patients who meet criteria for screening, an individual nurse may only have few opportunities to complete an SST. As a result, maintaining consistent and reliable administration and interpretation of the SST also presented as a challenge to this project. This project aimed to develop, implement and evaluate a dysphagia screening educational program that included performance monitoring and feedback and use of nurse champions to help promote EBP adoption and sustainability.

**Form a team.** In preparation for JCAHO PSC certification, a WMH stroke committee was already formed consisting of the nursing manager for critical services in the ED and ICU serving as the program director. Additional members included the neurologist, director of nursing and other acute care nursing managers for the medical-surgical floors as well as departmental managers for laboratory, radiology, rehabilitation and patient safety and quality services. Meeting times were on the third Wednesday of every month. The members of the dysphagia screening team became a subgroup of this committee (see Table 1).

As a key member of the dysphagia screening team, the SLP who also functioned as the director of rehabilitation, respiratory and social services, provided assistance in the development of the formal dysphagia screening educational program to increase knowledge and usage of the SST among the nursing staff. The appointed nurse champions, on the other hand, assisted in providing staff support and guidance through the implementation process. Finally, the director of patient safety and quality services aided in monitoring and analyzing outcomes data. The required resources needed to carry out this project consisted of the participation and support of these important stakeholders.

Table 1

*Evidence-Based Practice Team Members For Dysphagia Screening Program*

EBP Team Members	Role
Maria Fabro, MSN, APRN	Team Leader
Catherine Adams, MSN, RN	Opinion Leader, External Advisor, Director of Patient Safety and Quality Services
Kevin Myrick, BSN, RN	Opinion Leader, Manager for Critical Care Services: ED and ICU, Stroke Committee Director
John Harlacher, MEd, SLP	Opinion Leader, Manager for Rehabilitation Services, Respiratory Therapy and Social Services, SLP
Jeanette Gonzalez, BSN, RN	Change Agent for ED
Stephanie Cuyo, BSN, RN	Change Agent for MS
Emily Lucente, BSN, RN	Change Agent for ICU



The challenges for the team included finding sufficient time and resources to implement the project as planned when there were a multitude of other practice innovations being implemented at the hospital. The nurses were inundated with numerous inservices on stroke care in preparation for the JCAHO PSC visit. Competing demands and staff turnover could make adoption of an EBP difficult to achieve so Cullen and Adams (2012) suggested the use of trained change champions selected from each patient care unit to reinforce EBP and provide support. Opinion leaders have been shown to be effective in changing behaviors because they are regarded as knowledgeable and influential in their field (Titler, 2007). In addition to the core team members, acute care nursing managers and shift supervisors were also very instrumental in the success of the screening program by motivating and inspiring the nurses to adopt the new innovations in stroke care during their daily morning huddles and monthly staff meetings. Highlighting the advantages of EBP and compatibility with group values during the nursing staff's interactive discussions is essential to the adoption and sustainability of an EBP (Cullen & Adams, 2012; Titler, 2007).

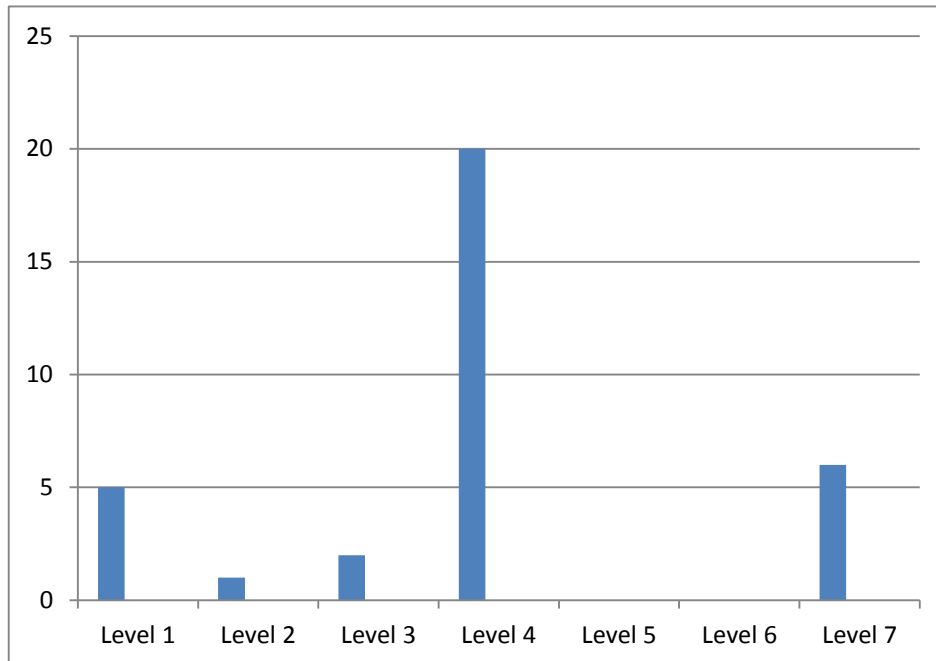
**Assemble relevant research and related literature.** An electronic search of CINAHL, PubMed, OVID and Cochrane Library was conducted using search terms “stroke”, “cerebrovascular disorders”, “acute”, “complications”, “aspiration”, “pneumonia”, “swallowing problems”, “dysphagia”, “deglutition”, “prevention and control”. Additionally, the AHA/ASA as well as the JCAHO and the Hawai'i State Department of Health (DOH) websites were consulted. From the 85 plus articles reviewed, 34 were selected for critique and synthesis. The publication times for the articles were from 1996 to 2013.

**Critique and synthesize research for use in practice.** The Mosby's Research Critique Tool was utilized to determine the level of evidence associated with the study design, which ranged from systematic reviews and randomized clinical trials (RCTs) to qualitative studies and expert opinions (Figure 2). This hierarchical rating system model represents the strength of the study design for each article selected. Grading of the strength of a body of evidence must also incorporate the three domains of quality, quantity and consistency (LoBiondo-Wood & Haber, 2010). The level of evidence for all 34 articles ranged from I to VII (Figure 3).



*Figure 2*

Mosby's Level of Evidence



*Note: Level 1=Meta Analysis/systematic reviews; Level 2=Experimental Design/Randomized Control Trial; Level 3= Quasi-experimental; Level 4= Case controlled, cohort studies, Longitudinal; Level 5= Correlation studies; Level 6= Descriptive studies including surveys, cross sectional design, developmental design, and qualitative studies; Level 7= authority opinion or expert committee reports; Other = Performance Improvement, review of literature.*

*Figure 3*

#### Numbers of Reports Reviewed

While examining the quality, quantity and consistency of the literature, it was noted that majority of the reports were cohort studies and systematic reviews of articles ranging in number from 234 to 832 dating as far back as 1985 obtained from PubMed, MEDLINE, CINAHL, EMBASE, and Cochrane Library, as well as reviews of references from relevant papers in the journals *Stroke* and *Dysphagia*. For the 20 articles on dysphagia screening, there was no RCT examining effectiveness of numerous SSTs and the impact of dysphagia screening on reducing the occurrence of aspiration pneumonia in stroke patients. Lakshminarayan et al. (2010)

explained that one must rely mainly on observational data due to ethical standards that would prohibit the randomization of stroke patients to a non-screening group. A significant quantity of research findings using cohort studies did point to a need for a formal screening protocol, as it was found to be associated with a higher adherence rate to dysphagia screening and a significantly decreased risk of pneumonia (Hinchey et al., 2005). According to literature, removal of dysphagia screening as a required performance measure for PSC Certification by JCAHO did not indicate that screening swallowing in patients with stroke was no longer best practice. The AHA/ASA GWTG Stroke still recommended swallow screening prior to administration of food, liquid, or medication in individuals presenting with stroke symptoms (Jauch et al., 2013).

Additional limitations noted in several of the studies included small sample sizes which led authors to identify the need for further studies. Moreover, the population characteristics were not clearly defined in most of the systematic reviews but for the cohort studies, patients consisted of adults ( $\geq 18$  years of age) with stroke and/or dysphagia. While several of the studies did not contain any description of ethnic and socioeconomic background, they were conducted in different parts of the world such as Denmark, Taiwan, Mexico, United Kingdom (UK), Australia, Canada and the United States.

### **Formal Dysphagia Screening Program**

According to the 2006 American College of Chest Physicians' (ACCP) practice guidelines, patients who are at high risk of aspiration on history and screening via SST should be referred to a SLP for swallowing evaluation. To ensure that appropriate treatment is initiated, the SLP evaluation may include a videofluoroscopy (VFS) or flexible endoscopic evaluation of

swallowing (FEES) (Armstrong & Mosher, 2011). Clinical practice guidelines (CPGs) from ASHA and AHA/ASA are in agreement with AACCP's recommendations (Appendix A).

In screening, there are five principle categories: demographics, medical history, global assessment, oral mechanism examination and swallowing assessment via water swallow test (WST) (Daniels et al., 2012). Several studies have shown that demographic features such as being greater than 65 years of age, male, with a history of pneumonia and reduced nutrition were associated with dysphagia and aspiration (Hibberd, Fraser, Chapman, McQueen & Wilson, 2013; Yeh et al., 2011). In addition, global assessment measures that include level of consciousness (LOC), Barthel Index Score and hemiplegia were also determined to be essential components of screening (Smithard et al., 1998; Daniels et al., 2012). The Barthel Index measures activities of daily living (ADL) independence and can serve as an indicator of stroke severity. Although stroke severity can also be measured by National Institute of Health Stroke Scale (NIHSS) and a high score has been linked to an increased risk of dysphagia and aspiration, feasibility and reliability of this scale may be restricted in a busy unit such as the emergency room and intensive care unit (Daniels et al., 2012).

Once it has been determined that a client is able to tolerate an oral mechanism examination and swallowing assessment based on his or her demographics, medical history and global assessment, a WST can be conducted. Direct assessment of swallowing using WST was associated with high quality studies, as reported by Daniels et al.'s (2012) systematic review of over 800 articles on dysphagia and stroke, and therefore, should be included in screening. Good predictors of aspiration in response to a WST were found to be cough and wet voice (Armstrong & Mosher, 2011). Oxygen desaturation may also be predictive of aspiration (sensitivity 73-87%; specificity, 39-87%) but more useful in combination with bedside testing than in isolation

(Ramsey, Smithard, & Kalra, 2003). A systematic review of 407 studies by Bours, Speyer, Lemmens, Limburg, & de Wit (2009) concluded that a water test combined with pulse oximetry using coughing, choking and voice alteration as endpoints is currently the best method to screen patients with neurological disorders for dysphagia. This combination led to sensitivities between 73-98%; specificities between 63-76% (Bours et al., 2009).

The purpose of a swallow screen is to identify those patients who do not need a formal evaluation by an SLP and who can safely take food and medications by mouth (Schepp et al., 2012). A primary consideration in the appraisal of screening tools is the degree to which the tool is able to correctly identify patients who have the condition (sensitivity) and those without the condition (specificity) (Perry, 2001b). Following this, it is useful to know the probability that patients really do have the condition if they test positive, (positive predictive value or PPV), or that the condition is actually absent if they test negative (negative predictive value or NPV). Due to fear of morbidity and mortality from complications of dysphagia such as aspiration pneumonia, the focus for SST has been primarily on having high sensitivity. Yet, to avoid unnecessarily withholding oral medications, fluids and nutrition, an SST with good specificity is equally important (Daniels et al., 2012).

In a systematic review conducted by Schepp et al. (2012), four out of 35 swallowing screening protocols identified met the basic criteria for reliability, validity and feasibility. As a board-certified neurologist and former SLP, Dr. Schepp conducted the search for articles and evaluated the swallow screening protocols with her co-authors using six criteria:

- Must describe a swallowing-screening protocol where screening is defined as a preliminary assessment by a healthcare worker as to whether or not a patient appears safe for oral intake at that moment in time.

- Must not require specialized skills or training in dysphagia, other than some basic training to carry out the screening protocol.
- Must include reliability data.
- Must specify a gold standard measure of dysphagia or aspiration against which the protocol's validity could be evaluated. Only formal swallowing evaluations, as performed by a specialty trained therapist, are considered a suitable gold standard, including formal bedside evaluation, video-fluoroscopy, fiberoptic endoscopy, or some combination of these assessments.
- Must describe the screening protocol in sufficient detail to be replicated.
- Must have been evaluated in patients with acute stroke.

In spite of their promising results, the Modified Mann and the Emergency Physician screening tools were considered preliminary studies due to their small sample sizes (Schepp et al, 2012). Additionally, both have to be administered by either a stroke neurologist or an emergency physician. Since Wilcox Hospital expressed preference for a tool that can be administered by its staff nurses, the Barnes Jewish Hospital Stroke Dysphagia Screen (BJHS-DS) was chosen by the WMH dysphagia team to be a better option in meeting institutional need with a sensitivity, specificity and negative predictive value (NPV) of 91%, 74% and 95%, respectively. Although it is copyrighted and requires four hours of training before it can be used by nurses at the bedside, the Toronto Bedside (TORR-BSST) also came as a highly recommended tool with a 91.3% sensitivity, 64% specificity and an NPV of 93.3% when used in the acute care setting, according to a quasi-experimental study (Martino et al., 2009). Most of the studies validated the SST being tested against an instrumental examination with videofluoroscopy (VFS), which is the gold standard for dysphagia screening, or against an SLP

swallowing evaluation. All four SSTs except for the Modified Mann have both an assessment of oropharyngeal function and ability to swallow water.

In 2011, SLPs at Pali Momi developed the HPH SST using a combination of swallow screening items from two previously validated SSTs. The bedside standardized swallow assessment (SSA) tool (Perry et al., 2001a) and Massey's tool (Massey & Jedicka, 2002) were selected because both tools have an observational component as well as a water swallow test. According to Pali Momi's manager of rehabilitation services, Sheryl Nakanishi (2014), the hospital was searching for an SST that was effective and easy to use. The HPH SST has been in used at Pali Momi since 2012 and has been integrated into the entire HPH EPIC EMR system since July 2013. Within 24 hours post-swallow screening, SLPs at Pali Momi conduct a chart review and a follow-up interview with the patient, family members, nursing staff to ensure that the patient is tolerating his or her prescribed diet (Nakanishi, 2014). Each of the nine screening protocols reviewed for this project are listed below in Table 2.

Table 2.

*Swallowing Screening Tools (SST)*

<b>Screening Tools/ Level of Study:</b>	<b>Procedure/ Sample Size:</b>	<b>Sensitivity &amp; Specificity, Negative Predictive Value (NPV) &amp; Positive Predictive Value (PPV):</b>	<b>Note:</b>
1. Modified Mann Assessment of Swallowing Ability ( <b><u>MMASA</u></b> )  (Antonios et al. 2010)	-100 point scoring system based on patient's level of consciousness, clarity of speech, saliva control, respiratory status, gag and cough reflex as well as the ability to follow commands such as moving his/her tongue;	Sensitivity: 87-93% Specificity: 84.2- 86.3% NPV: 92-95.3% PPV: 75.8-79.4%	* <u>physician-</u> <u>administered only</u> *good reliability *validated against clinical evaluation tool MASA within 2 hours; SLPs and physicians blinded to results



Screening Tools/ Level of Study:	Procedure/ Sample Size:	Sensitivity & Specificity, Negative Predictive Value (NPV) & Positive Predictive Value (PPV):	Note:
Level IV	<p>-Score <math>\geq 95</math> start oral diet and progress as tolerated; monitor and consult SLP if having difficulty</p> <p>-Score <math>\leq 94</math> NPO and consult SLP for swallow evaluation</p> <p>Training Time: Unknown Minutes to administer</p> <p>N=150</p>		*limitations: preliminary data
<p>2. Emergency Physician Dysphagia Screening</p> <p>(Turner-Lawrence et al., 2009)</p> <p>Level IV</p>	<p>2-tiered approach: failure of first tier if there is presence of swallowing complaints, abnormalities of voice quality, facial asymmetry, expressive or receptive aphasia.</p> <p><u>2<sup>nd</sup> tier</u>: water swallow test 10 ml from a Styrofoam cup without straw while seated in an upright position. Failure of 2<sup>nd</sup> tier if patient coughs, chokes during water drinking or had a change in voice quality after swallow. Also, a pulse oximetry decrease of <math>\geq 2\%</math> between baseline and minimum saturation during 120 seconds post water swallow test.</p> <p>Training time: unknown <math>\leq 3</math> minutes to administer</p>	<p>Dysphagia</p> <p>Sensitivity: 96%</p> <p>Specificity: 56%</p> <p>PPV: 74%</p> <p>NPV: 91%</p>	<p>*<u>physician-administered only</u></p> <p>*good reliability</p> <p>*validated against clinical swallowing evaluation by SLP; blinded</p> <p>*5 patients who developed pneumonia failed first tier</p> <p>*limitations: preliminary data; need larger, consecutive, more varied stroke patient population before widespread use of tool.</p>

Screening Tools/ Level of Study:	Procedure/ Sample Size:	Sensitivity & Specificity, Negative Predictive Value (NPV) & Positive Predictive Value (PPV):	Note:
	N=84		
<p>3. Toronto Bedside Swallowing Screening Test (TOR-BSST)</p> <p>(Martino et al., 2009)</p> <p>Level III</p>	<p>Proprietary but involves pass/fail on the following items: dysphonia, pharyngeal sensation, tongue movement and <u>water swallow test</u> (10 x 5 ml bolus followed by a sip from a cup). If no coughing or change in voice quality, passes the test.</p> <p>Training time: 4 hours -10 minute procedure -screen only if alert, can be supported upright and follow simple instruction.</p> <p>N=311</p>	<p>Sensitivity: 91% Specificity: 67% PPV: 77% NPV: 93%</p>	<p>*<u>nurse screeners</u> *good reliability *validated against VFS *4 hour training include A&amp;P of swallowing and patient care strategies</p>
<p>4. Barnes-Jewish Hospital Stroke Dysphagia Screen (BJH-SDS)</p> <p>(Edmiaston et al., 2013)</p> <p>Level IV</p>	<p>-If clinical assessment reveals a Glasgow coma scale of less than 13, facial, tongue, palatal asymmetry, client is referred to the SLP for further evaluation.</p> <p>- If none of the above is present, a 3 oz. water test is done and client is monitored for throat clearing, cough, change in vocal quality. If client passes, he or she started on a regular diet. If not, SLP consult.</p>	<p>Dysphagia</p> <p>Sensitivity: 91-94% Specificity: 66-74% PPV: 54-71% NPV: 93-95%</p>	<p>* <u>nurse screeners</u> good reliability *validated against <u>VFS</u> within 24 hours *No increase in pneumonia incidence during 5 year implementation</p>

<b>Screening Tools/ Level of Study:</b>	<b>Procedure/ Sample Size:</b>	<b>Sensitivity &amp; Specificity, Negative Predictive Value (NPV) &amp; Positive Predictive Value (PPV):</b>	<b>Note:</b>
	<p>Training time: 10 minutes 2 minutes to administer</p> <p>N=300 &amp; 225</p>		
<p>5. Gugging Swallow Screen (Trapl et al. 2007)  Level IV</p>	<p>GUSS is a simple stepwise bedside screen that allows a graded rating with separate evaluations for nonfluid and fluid nutrition starting with nonfluid textures.</p> <p>Training time: Unknown</p> <p>N=50</p>	<p>Sensitivity of 100%, specificity 50-69%, NPV of 100%</p>	<p>* Interrater reliability good at K=0.835, p&lt;0.001</p>

Screening Tools/ Level of Study:	Procedure/ Sample Size:	Sensitivity & Specificity, Negative Predictive Value (NPV) & Positive Predictive Value (PPV):	Note:
<p>6. 3-step Dysphagia Screening (3- SSS)</p> <p>(Yeh et, al., 2011)</p> <p>Level III</p>	<p><u>1<sup>st</sup> step</u>: patients with consciousness disturbance, prior dysphagia, poor oxygen saturation (&lt;90%) with oxygen-mask dependence or intubation, obvious saliva drooling or frequent choking on saliva and dependence on tube feeding.</p> <p><u>2<sup>nd</sup> step</u>: This is followed by sitting the patient up and providing oral hygiene then a 3- ml water swallow repeated three times while monitoring for signs of laryngeal elevation or choking or a wet voice after swallowing. Patients who pass proceed to the <u>third step</u> which includes swallowing 100 ml of water within 1 min repeated twice. If patient fails at any step, oral intake is postponed, tube feeding is given, the SLP is consulted, and the screen is repeated in 7 days. If prolonged dysphagia seems apparent, PEG feeding is offered as an option to the patient and family.</p> <p>Training Time: Unknown N=176</p>	<p>Cited previous reports that this bedside screen has high sensitivity and specificity in detecting dysphagia</p>	<p>*Incidence of pneumonia: Prescreen group 60.8% Postscreen group 53.9%</p> <p>*reduced incidence of pneumonia with dysphagia screening (p=0.005)</p> <p>* Higher NIHSS score, older age and nasogastric placement was shown to be associated with pneumonia</p>

Screening Tools/ Level of Study:	Procedure/ Sample Size:	Sensitivity & Specificity, Negative Predictive Value (NPV) & Positive Predictive Value (PPV):	Note:
<p>7. Standardized Swallowing Assessment (SSA)</p> <p>(Perry et al., 2001a)</p> <p>Level IV</p> <p>*Similar SST described by Westergren (2006) below</p>	<p>SSA comprises of 3 sections and was designed to terminate if a problem was encountered. <u>First section</u> checked whether the patient was physically capable of screening. <u>Sections 2 and 3</u> comprised of the main screening test. Volitional cough, saliva control, oro-motor dexterity respiratory compromise, and phonation were first evaluated; if no problems were elicited, the ability to <u>swallow water</u> was observed. 3 teaspoon of water followed by half a glassful. Watch for coughing and change in voice quality.</p> <p>N=200</p>	<p>Dysphagia</p> <p>Sensitivity: 94% Specificity: 90% Positive predictive value: 92% Negative predictive value: 96%</p>	<p>*used by nurses. * Compared to the summative clinical judgment of dysphagia based on SLP clinical assessment</p>
<p>8. Standardized Bedside Swallowing Assessment (SSA)</p> <p>(Westergren, A. , 2006)</p> <p>Level 1</p>	<p><u>3 stages:</u></p> <ol style="list-style-type: none"> <li>1. General assessment: conscious level, postural control, voluntary cough, voice quality, ability to swallow saliva</li> <li>2. Sipping water from a spoon and monitoring voice quality and coughing</li> <li>3. Drinking water</li> </ol>	<p>Sensitivity: 97% Specificity: 90% PPV: 92% NPV: 96%</p>	<p>*good reliability *decreased 6-month incidence of chest infections *SSA tool first developed in 1996 by Smithard et al.; researched by Perry in 2001.</p>

Screening Tools/ Level of Study:	Procedure/ Sample Size:	Sensitivity & Specificity, Negative Predictive Value (NPV) & Positive Predictive Value (PPV):	Note:
	<p>from a glass. If client fails at any stage: referral to SLP, NPO If passes: normal diet and fluids under observation for 24 hours</p> <p><u>Summary Review</u> with one quasi experimental study with sample of 400 patients doing either pre- test or post-test.</p>		
<p>9. Massey Bedside Swallowing Screening</p> <p>(Massey &amp; Jedicka, 2002)</p> <p>Level IV</p>	<p>If patient is alert and does not exhibit any of the following: slurred or garbled speech, trouble speaking or understanding words, drooling or have a wet-sounding voice, patient may proceed to water test. 2<sup>nd</sup> step: administer a teaspoon of water to patient and watch for coughing, gurgly voice sounds, water dribbling out of the patient's mouth. If any of the following happen, stop screening. If not, proceed to giving patient 60 ml of water and again watch for coughing, gurgly voice and water dribbling. If yes, make patient NPO and obtain order for swallow evaluation by SLP.</p> <p>N=25</p>	<p>Experts supported content validity.</p> <p>Specificity and Sensitivity at 100%.</p>	<p>2 reviewers evaluated <b>25 participants</b> within 2 hours apart</p> <p>* High interrater reliability</p> <p>Limitations: small sample</p>

Screening Tools/ Level of Study:	Procedure/ Sample Size:	Sensitivity & Specificity, Negative Predictive Value (NPV) & Positive Predictive Value (PPV):	Note:
10. Hawai'i Pacific Health (HPH) Swallowing Screening Tool  (Nakanishi, S., 2014)	<p>2 stages:</p> <ol style="list-style-type: none"> <li>1. Clinical assessment: conscious level, facial symmetry, speech, voice quality, ability to swallow saliva</li> <li>2. Sipping water from a spoon and monitoring voice quality and coughing X3; followed by 3 oz. of water from a cup if no wet voice and coughing.</li> </ol> <p>If client fails at any stage: physician is notified; referral to SLP, NPO If passes: physician notified; normal diet and fluids under observation</p> <p>Training time: one hour to include didactic and hands-on practice</p> <p>≤10 minutes to administer</p>	<p>*developed and reviewed by HPH SLPs</p> <p>*SLPs evaluated patients within 24 hours post-swallow screening.</p> <p>Based on Massey and SSA SSTs: Sensitivity: 94-100% Specificity: 90-100%</p>	<p>*derived from the Standardized Bedside Swallowing Assessment (SSA) and Massey Bedside Swallowing Screening Tools</p> <p>*integrated into HPH EPIC EMR system; stroke order sheets; stroke care pathway and algorithm</p>

*Note: VFS- videofluoroscopic swallow study*

Conference proceedings from the State of the Art Nursing Symposium in 2012 on dysphagia screening suggested that since dysphagia screening is not a “one size fits all” process, health care organizations can use the Kepner-Tregoe Decision Matrix (K-T Matrix) model (Table

3) to decide which valid and reliable SST would best suit their needs (Donovan et al., 2013).

The rows are divided into items that are weighted by what the institution considers important, with “must” items bolded and “want” items scored. Bolded items must be present before scored items are considered, and in the case below, the dysphagia screening project team deemed the HPH SST to be the best tool based on its ability to meet the institution’s identified needs.

Table 3.

*Kepner-Tregoe Decision Matrix*

Screening Characteristics	<b>HPH SST (combination of Massey and SSA SST)</b>	BJH-SDS	Toronto
<b>Easily Administered</b>	<b>X</b>	X	X
<b>Validated by: SLP evaluation and/or instrument (VFS or FEES)</b>	<b>X</b>	X	X
<b>Reliable</b>	<b>X</b>	X	X
<b>High Sensitivity &gt;90%</b>	<b>X</b>	X	X
High Specificity >70% (7 points)	<b>7</b>	7	0
Evidence-Based (10 points)	<b>10</b>	10	10
Minimal Training (1 point)	<b>1</b>	1	0
Easily documented: integrated into HPH EMR EPIC system (5 points)	<b>5</b>	0	0
Total	<b>23</b>	18	10

*Note: Bolding indicates “must items” (i.e., institution requires that the dysphagia screening has these characteristics). (Donovan et al., 2013)*

The top three SSTs selected to be closely reviewed by the dysphagia screening project team using the K-T Matrix can be nurse-administered and have been identified by content experts (SLPs) as meeting the basic criteria for validity, reliability and feasibility (Schepp et al, 2012; Westergren, 2006; Perry, 2001a; Massey & Jedicka, 2002; Harlacher, 2014). The HPH SST was chosen by the dysphagia screening team to be used for this project because as an



additional benefit, the SST was already integrated into the HPH EPIC EMR and has been in used within the HPH system since 2012.

### **Dysphagia care protocol**

Dysphagia care standards were derived from clinical practice guidelines (CPG) published by the ASA/AHA GWTG Stroke (Jauch et al., 2013) and the ASHA (ASHA, 2004) (Appendix B). In addition to screening and evaluation of swallowing are practice recommendations in the care of clients at risk for stroke-associated pneumonia (SAP). Oral hygiene consisting of mechanical cleaning and oral decontamination with antimicrobial agents such as a chlorhexidine (CHX) oral agent has been shown to reduce colonization of pathogens that could lead to pneumonia (Tada & Miura, 2012). Moreover, protection and moistening of the oral cavity with synthetic saliva also led to a decreased incidence of pneumonia in a non-randomized controlled study (Sorensen et al., 2013). Early mobilization, according to a systematic review done by Hannawi, Hannawi, Rao, Suarez and Bershad (2013) contributed to a lower risk of SAP. Currently, Wilcox is implementing oral care and frequent turning of patients who are dependent on their ADLs to prevent complications such as SAP.

A meta-analysis done by Foley, Teasell, Salter, Kruger and Martino (2008) revealed that swallowing treatment programs are associated with a reduced risk of pneumonia during the acute stage of stroke. Low intensity swallowing therapy is composed of swallowing compensation strategies such as environmental modifications (sitting upright during meals), safe swallowing advice (reduced rate of eating) and appropriate dietary modification. High intensity therapy, on the other hand, also includes swallowing exercises such as effortful swallowing and supraglottic swallow technique. The choice of swallowing therapy intensity level is directed by findings of the SLP evaluation and VFS (Carnaby, Hankey & Pizzi, 2006). At Wilcox, the SLP and dietitian

work closely together to ensure that the client receives the appropriate swallow therapy and dietary modification. Since there is only one SLP and two dietitians for the entire hospital, it is imperative that the nursing staff, patient and family members are involved in reinforcing the prescribed techniques for feeding and swallowing. This can be achieved through education, informational handouts and communication boards.

Finally, poor discharge communication can lead to inappropriate post-hospital dysphagia care and development of complications such as aspiration pneumonia, malnutrition and dehydration (Kind, Anderson, Hind, Robbins & Smith, 2011). To avoid costly re-hospitalization, it is important to have in place a discharge planning program that involves a multidisciplinary team approach. Patient and family education must be initiated and reinforced prior to discharge. The case managers at Wilcox hold regular multidisciplinary meetings for each patient to monitor progress and develop a transitional care plan as discharge approaches.

### **Multidisciplinary educational program**

In a cluster randomized controlled trial, the implementation of a multidisciplinary team-building and standardized interaction education program to implement evidence-based treatment protocols for the management of swallowing dysfunction, fever, and hyperglycemia resulted in positive patient outcomes after discharge from stroke units (Middleton et al., 2011). For the management of swallowing dysfunction, the nurses attended an inservice about dysphagia screening provided by the SLP and later underwent a competency assessment before being able to carry out the screening on patients. Each nurse took a pre-education and post-education written knowledge test followed by a skills competency test on three patients. In Smith, Craig, Weir, and McAlpine's (2007) qualitative study using focus groups and interviews, health care

providers (HCPs) expressed preference for face to face, accredited education using blended approaches to accommodate multidisciplinary needs.

Nurses at Wilcox were in need of these types of educational programs since dysphagia screening was not part of routine nursing care. In order to strengthen their assessment skills in dysphagia screening, an online dysphagia care module and face-to-face inservice and competency testing were made available by this project in partnership with the WMH Education Department. Continuing education on the care of stroke patients with dysphagia was presented by a multidisciplinary team that consisted of the SLP and nursing. Other disciplines such as the neurologist, dietitian and physical and occupational therapists were also involved in providing inservices for stroke care.

### **Summary of literature review**

Review of literature provided ample evidence that dysphagia screening is a well-established best practice in the care of patients with stroke. It allows for early intervention to reduce morbidity, mortality and health care costs. Despite the lack of one standardized SST, experts in dysphagia care suggested the use of K-T Matrix model to decide which valid and reliable SST would best suit the needs of the health care institution and its patients.

Universal screening of swallowing function for all patients with acute stroke within 24 hours of admission by nurses who were identified as the professional group best placed to accomplish this was an essential component of this project (Perry et al., 2001b). A nursing training program was jointly set up between nursing and the SLPs. Educational topics presented included the anatomy and physiology of swallowing, identification and management of dysfunction. Skills practice assessments per trainee were established. Standard that was implemented was for all patients with acute stroke to have their swallow function screened

within 24 hours of admission. Algorithms for swallow screening and dysphagia care were to be provided to each individual nurse to help guide management. They were also integrated into the WMH stroke code algorithm, stroke order, and stroke care pathway.

## **Chapter 3. Methods**

### **Introduction**

Aspiration pneumonia in stroke patients increases their risk of dying by five-fold (Masrur et al. 2013). Preventing stroke complications such as aspiration pneumonia is one of the essential care elements of a PSC (Alberts et al., 2011). For the County of Kaua'i, which has the highest age-adjusted stroke mortality rate in the state, the formation of a PSC will improve access and quality of care for its residents. Hence, the objective of this project was to develop and implement a formalized dysphagia screening program for adult stroke patients ( $\geq 18$  years of age) at Wilcox Memorial Hospital in preparation for JCAHO PSC certification. The PICO statement was as follows:

- P-Patient population: Adult stroke patients admitted at Wilcox Hospital
- I-Intervention: Formal Dysphagia Screening Program
- C-Comparison intervention: Current Practice
- O-Outcome: Increased compliance with dysphagia care protocol and reduce dysphagia related complications such as aspiration pneumonia.

Using the Iowa Model of Evidence-Based Practice as a conceptual framework, critique and synthesis of research demonstrated that a formal dysphagia screening program taught using a multidisciplinary educational approach was effective in reducing incidence of aspiration pneumonia in stroke patients. Variables that determine the rate of adoption for these proposed strategies as derived from the Diffusion of Innovation Model were examined and incorporated as vital components of this project. According to E.M. Rogers (2003), the diffusion of new ideas is greatly influenced by the perceptions of potential innovation adopters. The use of nursing change champions to assist in marketing the innovation led to its successful adoption.

Finally, the Logic Model was utilized to illustrate the connection between the implementation strategies and the intended outcomes of this project. In addition to opening up communication channels and increasing transparency, a participatory type of evaluation plan through active engagement of stakeholders helped address any identified areas of improvement (CDC, 2011).

### **Conceptual Framework**

**Iowa model of evidence-based practice.** Titler's Iowa model of evidence-based practice (EBP) served as an effective guide for nurses and other health care providers in ensuring the delivery of safe and high quality care (Melnik & Fineout-Overholt, 2011). Widely recognized for its applicability and ease of use, the Iowa model is equipped with feedback loops and decision points to demonstrate the continuous cycle of quality improvement (Titler et al., 2001). After identifying the "triggers" or practice questions for this project, the formation of an EBP team and the critique and synthesis of research were undertaken as the project neared the implementation stage.

**Diffusion of innovation model.** The four elements that influence the rate of adoption as presented by E.M. Rogers' (2003) Diffusion of Innovation (DOI) model include: innovation, communication channels, time and social system. The DOI element that posed the greatest challenge for this project was the social system where established norms can become barriers to change. One of the critical interventions for aspiration pneumonia prevention in stroke patients is the swallowing screen, which is traditionally performed by the SLP. Since there was only one SLP at Wilcox Memorial Hospital (WMH), there was a growing need to begin utilizing other health care providers such as nurses and physicians to conduct timely bedside dysphagia screening at the facility. The AHA/ASA 2013 guideline for early management of patients with

acute ischemic stroke states that bedside swallow screens can be safely performed by other health care providers such as nurses (Jauch et al., 2013). Without proper training to help nurses differentiate the operational terms, “screening” versus “evaluation”, the rate of adoption can be hindered by a health care social system that still clings to the belief that swallow screens are outside the scope of nursing practice. Recruiting the support of change agents and opinion leaders within the organization where the innovation was planned to be introduced and implemented has been shown to be an effective strategy in influencing the members of the social system to adopt change (Rogers, 2003).

In examining the five attributes of innovation, the added complexity as well as the poor observability of this project’s long-term goal of preventing aspiration pneumonia produced additional challenges to its rate of adoption. To cope with this, the engagement of stakeholders, which included the nurses, patients and families, was carried out throughout all phases of the project. A shared understanding of the project was achieved through the use of the LOGIC model as it was shown to assist in clearly illustrating the link between the project’s planned activities and intended outcomes.

### **Pilot/implement evidence-based practice change**

**Definitions.** The Centers for Disease Control and Prevention (CDC) criteria for clinically-defined pneumonia include (Horan, Andrus, & Dudeck, 2008):

- Presence of a new and persistent infiltrate or consolidation on at least one chest x-ray or at least two serial chest x-rays in the case of underlying lung disease combined with **one** of the following clinical signs: fever, leukopenia or leukocytosis, and altered mental status in more than 70 years of age in the absence of other causes.

- **PLUS two** of the following signs and symptoms: new-onset purulent sputum or change in the character of the sputum, new-onset or worsening cough, rales, and worsening gas exchange.
- Pneumonia with common bacterial pathogen has similar definitions as clinically defined pneumonia, however, it is accompanied by a positive culture from the blood, pleural fluid, quantitative culture from the broncho-alveolar lavage or lung parenchyma.

Moreover, the American Thoracic Society (ATS) further classifies pneumonia into various types to assist in pathogen identification and treatment selection (Lewis, Dirksen, Heitkemper, Bucher, & Camera, 2011):

- Hospital-acquired pneumonia (HAP) occurs 48 hours or longer after hospital admission and not incubating at time of hospitalization.
- Health care-associated pneumonia (HCAP) is a new onset pneumonia in a patient who was hospitalized in an acute care hospital for 48 hours or longer within 90 days of the infection; resided in a long-term care facility; received recent intravenous antibiotic therapy; chemotherapy or wound care within past 30 days of infection.
- Ventilator associated pneumonia (VAP) is defined as pneumonia in patients who had a breathing control device within the 48 hour period before the onset of infection.
- Community-acquired pneumonia (CAP) has signs and symptom onset in the community or during the first two days of hospitalization.
- Aspiration pneumonia occurs from abnormal entry of secretions or substances into the lower airway. Aspirated materials can lead to a noninfectious or chemical pneumonitis (lung inflammation), however, the most common form is bacterial infection.



- Post-stroke pneumonia or stroke-associated pneumonia (SAP) is defined as pneumonia that occurred after a stroke and it could be acute (within a month of stroke) or chronic (later than a month). It can also be classified as a HAP, HCAP, or CAP.

Finally, dysphagia, is defined as difficulty swallowing, and occurs in 42-67% of patients within three days of stroke (Donovan et al., 2012). In addition to the immunodepression induced by stroke, aspiration secondary to dysphagia and impaired level of consciousness (LOC) have all been found to contribute to the development of SAP (Hannawi et al., 2013).

The AHA/ASA international stroke conference proceedings concluded that the early identification of dysphagia and aspiration risk is vital in preventing adverse health outcomes in stroke patients (Donovan et al., 2013). Establishing operational definitions to distinguish the difference between dysphagia “screening” and dysphagia “evaluation” (clinical or instrumented) was necessary in clarifying what role SLPs and other health care providers such as nurses play in identifying and treating stroke patients with dysphagia (Donovan et al., 2013). According to the American Speech-Language-Hearing Association (ASHA), dysphagia screening is a pass/fail procedure to identify patients who are in need of a comprehensive dysphagia evaluation by the SLP. The SLP evaluation includes a behavioral assessment of swallowing function via cranial nerve testing and direct examination of swallowing using food and liquids of various textures and consistencies. The SLP may also request an instrumental dysphagia study that includes videofluoroscopic (VFS) or flexible endoscopic evaluation of swallowing (FEES) to determine the exact swallowing impairment (oropharyngeal or esophageal) as well as the effects of compensatory strategies, such as chin tuck or thickened liquids, on the patient before dysphagia rehabilitation and dietary modifications are initiated (Donovan et al., 2013).

**Setting.** As the largest nonprofit medical facility on Kaua'i, WMH is an affiliate of the Hawai'i Pacific Health (HPH) organization. There are more than 170 physicians on staff offering over 22 different specialty care areas including neurology. WMH contains 71 acute care beds along with seven beds in intensive care unit (ICU), 20 in emergency department (ED), 20 in same day surgery, and five in the birthing unit. As a level III trauma hospital, the facility is equipped with magnetic resonance imaging (MRI) and computed tomography (CT) scanners. Within the past few years, Wilcox has been recognized by the AHA/ASA for excellence in care of patients with stroke, heart failure, and coronary artery disease (CAD). Recently, the hospital identified becoming a JCAHO-certified primary stroke center as an organizational priority. A critical element of stroke centers include having written care protocols to manage stroke complications such as dysphagia and SAP.

Since most of the swallow screens by nurses were expected to take place in the ED during triage and patient admission, the ED was the original setting for this project until the stroke committee later decided to provide swallow screening training system wide. The swallow screening tool (SST) was incorporated into the hospital's EPIC admission data base as a required nursing screen during triage. Unless the patient is a direct admit, most admissions occur in the ED so nurses here are more likely to conduct the initial swallow screen. Nurse staffing in ED included 24 full-time RNs and three part-time RNs.

According to Hannawi et al. (2013), the incidence of SAP is higher in ICU than it is in stroke units or acute general floors due to co-morbidities, mechanical ventilation and higher stroke severity that lead to aspiration and immunodepression. For that reason, the ICU was also selected as one of the settings for this project. Nurse staffing in the ICU consisted of 12 full-time (FT) registered nurses (RNs), four part-time RNs and two per-diems.

As the project neared the implementation stage, the organization decided to integrate the program systemwide since it will be applicable in all settings, including the acute floors.

Dysphagia could persist for some stroke patients after they have been transferred out of ICU or ED. Thereby, nurses on medical-surgical floors will also have to care for these patients and should become competent in carrying out the swallow screenings.

**Sample.** Nurses have the most contact with patients and therefore, play a key role in preventing SAP. The main goal of this project was to increase the nurses' knowledge and awareness, which in turn, led to a change in behavior and enhancement of nursing skills.

There was a convenience sample of ICU, ED, and medical-surgical nurses who participated in a pre-and post-intervention survey to help determine if the interventions have an effect on their knowledge, awareness and skills confidence. Since a before-after design was vulnerable to an internal validity threat with testing, only a post-intervention written testing was conducted. Additionally, these nurses also underwent skills testing post-intervention to determine each nurse's level of proficiency in conducting swallow screens.

To be in accordance with the ASA/AHA performance improvement Get-With-The-Guidelines (GWTG) program, inclusion criteria for patients was a diagnosis of acute stroke or transient ischemic attack (TIA) and that they be over 18 years of age. Exclusion criteria for stroke patients included the presence of a lung infection at the time of admission. Absence of pneumonitis and/or pneumonia on admission was a necessary baseline to have in order to accurately determine the impact this project had on reducing incidence of aspiration pneumonia in stroke patients.

Between August 2012 and July 2013, Wilcox Hospital admitted a total of 115 patients diagnosed with acute stroke (Adams, 2013). With an average of approximately 10 stroke

patients admitted per month, sample sizes for nurses and patients were not restricted during the project's implementation period. The aim of the project was to capture as many nurses and stroke or TIA patients admitted to WMH.

**Innovation/practice change.** An important element of Rogers' (2003) DOI model is innovation and its rate of adoption is influenced by the following attributes: relative advantage, compatibility, complexity, trialability and observability. Although an evidence-based innovation to decrease morbidity and mortality caused by SAP was recognized as having relative advantage and as being compatible with the existing organizational value and belief system of promoting patient safety and quality care, its added complexity and poor observability due to infrequent patient admissions demanded the use of multiple change techniques to achieve an accelerated adoption rate and sustained practice. Techniques found to be effective in raising awareness, increasing knowledge, and promoting behavior change include the use of information, performance monitoring, problem-solving, social support, materials and media (Briscoe & Aboud, 2012). These strategies were carried out using the following practice change and educational formats:

- A dysphagia care guideline and algorithm with recommendations from the AHA/ASA, CDC, American Thoracic Society and ASHA. Currently, Wilcox has intranet resources such as Up to Date and Lippincott, Williams and Wilkins skills and procedure. These were used as supplements to the guideline (Appendix C).
- Bedside visual algorithms of swallow screening process for providers (Appendix D).
- Patient's swallowing status and treatment plan written on communication boards to engage patients and families and serve as reminders.

- EPIC Electronic Medical Record (EMR) with the following items incorporated into the data system: nurse swallow screen, stroke care flow sheet, plan of care, education.
- Online teaching modules for staff via the hospital's health stream learning center (HLC) which awarded continuing education credits (CEs). (Appendix E)
- Hands-on skills training and competency testing on the nursing swallow screen tool (SST) (Appendix F)
- Nurses' annual skills competency requirements (Appendix G).
- Change agents and opinion leaders in the form of departmental staff, managers and shift supervisors trained to serve as consultants.
- Wilcox Hospital also has an online evidence-based clinical decision support resource available in their intranet called Up to Date.

The AHA/ASA 2013 guideline on the early management of patients with acute ischemic stroke highly recommends the formation of primary stroke centers certified by an external governing body such as the Joint Commission (JCAHO). To ensure continuous quality improvement and compliance with the eight JCAHO-mandated quality measures for stroke care, AHA/ASA also advocates for the establishment of a stroke care data repository which includes the Get-With-The-Guideline (GWTG) Stroke management and data collection tool. These were already in place at Wilcox via their EMR system and were useful in monitoring compliance especially for the two JCAHO quality measures (Appendix H), education and rehabilitation assessment of stroke patients, which covered several of this project's care strategies.

Wilcox nurses needed to increase their familiarity with the swallow screening process and dysphagia care strategies as they continue to work alongside other disciplines such as rehabilitation personnel, dietary, case managers who are essential in the care of stroke patients.

In the hospital's EMR, the nursing swallow screen was already incorporated into the EPIC admission data base since July 2013, however, nurses have not yet received formal training on how to perform this screening. During patient admission, the swallow screen is conducted as follows:

- In the EPIC admission navigator, the following question appears under Nutritional Assessment: Patient presents with signs/symptoms of stroke OR neuro changes? If yes is selected, a set of questions follows:

The screenshot shows the 'Nutritional Assessment' section of the EPIC EMR. The left sidebar lists various patient history categories. The main form contains several questions with 'Yes', 'No', and 'Other' options. The question 'Pt presents with s/s of stroke OR neuro changes?' is circled in red.

Question	Yes	No	Other
Special diet at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hx of Bariatric surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you wear dentures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diet consistency for solid foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diet consistency for liquids	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DM New Diagnosis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eating less than 50% w/in last 5 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wt. loss greater than 5 lbs in past mo. - unin...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stage three or four pressure ulcer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intubated on ventilator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No needs identified on admission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pt presents with s/s of stroke OR neuro changes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The screenshot shows the list of dysphagia symptoms that appear after selecting 'Yes' to the stroke or neuro changes question. The list is circled in red.

Question	Yes	No	Other
Pt exhibits any of the following	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unable to follow directions, Water test not done	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unable to manage secretions, Water test not done	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facial asymmetry, Water test not done, physician ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slurred speech, Water test not done, physician ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unable to eat regular consistency diet, Water ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On 5L of O2 or more, Water test not done, phys ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On thickened liquids or modified consistency d ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None of the above - no signs of dysphagia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- If the nurse chooses any answer other than "None of the above – no signs of dysphagia", the screening is completed and the water test is not done. The patient is kept NPO or nothing by mouth. Then, the physician is notified and the speech pathologist is consulted so a swallowing evaluation can be done.

- If the nurse chooses “None of the above – no signs of dysphagia”, the water screening must be performed prior to anything being administered by mouth including medications.

The instructions for the procedure are in red.

Best Practice

Orders

Held/Pended Orders

Orders

Order Sets

Patient History

Allergies

Medication Hx

History

Immunizations

Problem List

Water swallow test performed

Row Information:

**Nursing water screening must be performed prior to anything administered by mouth including meds: Procedure: Once mouth is clean, with patient at a 90 degree angle, give patient one teaspoon of water for 3 trials, then have patient drink 3oz. of water from a cup. If patient exhibits any signs/ symptoms of aspiration at any time during test, keep patient NPO, notify MD and consult Speech Pathology.**

- If the patient passes the water test, the diet can be advanced as ordered. If the patient fails the water test, the patient remains NPO and the physician is notified so a speech pathologist consult can be ordered.

As part of the multidisciplinary educational program, the SLP along with the project leader provided hands-on skills training during the nurse’s annual competency fair scheduled for the year 2014. After completion of the online HLC module on stroke care and the skills training, the nurses took a written post-test and skills testing to demonstrate proficiency. The nurse managers as opinion leaders as well as the SLP and change agents served as swallow screen consultants to provide continuous support through the transition process. According to Balas et al. (2013), strategies such as performing daily interdisciplinary rounds, engaging key implementation players ( via morning huddles) and sustained and diverse educational efforts help facilitate the implementation of a new innovation.

For discharge planning, patient and family education was an important component that was implemented using a multidisciplinary approach. Numerous studies have shown that deeper

learning takes place when members of a system are engaged at the behavioral, social, sensory and cognitive level (Briscoe & Aboud, 2012). Verbal and written instructions were provided as well as visual reminders via the communication board in the patient's room which were reinforced by the nurses, rehabilitation personnel and dietitian as they provided swallow therapy, dietary modification, oral hygiene and physiotherapy to prevent SAP from occurring. Compliance to the dysphagia care guideline was monitored via documentation in the patient's EPIC flowsheet.

### **Monitor/analyze structure, process and outcome data**

**Program evaluation plan.** Using the LOGIC model, the project has the following outputs and outcomes. The outputs of the program with at least 80% participation from stakeholders (health care team, patient and family) included:

- Conduct stroke team monthly meetings.
- Develop and disseminate program guideline and/or protocol.
- Provide regular (yearly) multidisciplinary seminar on stroke care as part of PSC requirements.
- Conduct yearly skills review and competency testing on swallow screens.
- Provide patient and family education.

The outcomes ranging from short-term to long-term included:

- Annual competency fair was to be attended by at least 80% of intended audience which will be measured by looking at the attendance sheet.
- Post-test scores for HLC module were to be at least 80%.
- At least 80% of nursing personnel were to be able to demonstrate proficiency in conducting swallow screen after skills training.



- At least one nursing staff (supervisor) per shift was to be proficient in conducting swallow screens by demonstrating good inter-rater reliability with SLP and be the designated consult person.
- At least 80% of nurses were to demonstrate increased confidence and familiarity with swallow screening tool and protocol via nurse perception survey pre- and post-implementation.
- 100% of eligible patients were to be screened, evaluated and treated for dysphagia via chart review and/or documentation of bedside checklist of strategies.
- At least 95% of patient and family members were to express satisfaction with management of dysphagia and risk of aspiration pneumonia. This was to be measured by a patient satisfaction survey using a Likert scale and open-ended questions.
- Incidence of aspiration pneumonia in stroke patients was to decrease by at least 50% as well as a downward trend in length of stay and readmission rates for pneumonia. These were to be monitored by the hospital's Department of Patient Safety and Quality Care using the hospital's existing data base system called the Quality Advisor via the Premier Advisory Software. An EPIC EMR chart review was also conducted by project leader.
- Decreased age-adjusted stroke mortality rate to meet Healthy People 2020 Goal for County of Kaua'i.

### **Procedure/Timeline**

Nurses, as frontline caregivers, were the target users of this innovation. Prior to implementation, an online nurse perception survey (Appendix I) of the ICU and ED nurses were collected and analyzed to determine their familiarity with the current stroke and aspiration pneumonia prevention guidelines including the EPIC's nursing swallow screen. The survey

helped identify any current or potential barriers to stroke care and the nurses' level of confidence in their knowledge and skills ability. The rationale behind this marketing strategy was to engage an important stakeholder group and initiate a dialogue about the significance of this project. The result of this survey was to be shared with the nurses to determine accuracy and to serve as a stimulus for their active involvement in the project. Other marketing strategies included:

- Handouts with algorithms for swallowing screening, aspiration pneumonia prevention and dysphagia care were to be posted in the nursing stations and patient rooms to serve as visual reminders for staff, patient and family members.
- Availability of Continuing Education (CE) credits after successfully achieving a post-test score of at least 80% for each of the hospital's health stream learning center (HLC) modules.
- Nurses were to be paid to attend one of the yearly competency fair sessions conducted between May-September 2014 which featured dysphagia care and nursing swallow screen skills demonstration and practice.
- Program and swallow screen consultants (supervisors and change champions) were to be available around the clock for staff to help identify barriers and brainstorm solutions.
- A suggestion box was to be placed in each of the department's nursing break room accompanied by a continual supply of edible incentives such as fruits and chocolates.

Following the pre-implementation nursing survey, ongoing engagement of staff, patient and family was to be carried out via regularly scheduled discussions and surveys. For staff, daily huddles, floor rounding and nursing meetings conducted by supervisor or nurse manager were to serve as forums for discussing concerns about the program expressed by the staff, patient and family. For patient and family members, their feedback and level of satisfaction with care

provided were to be assessed frequently via floor rounding by nurses and supervisors as well as managers. Additionally, a patient/family satisfaction survey was to be collected using the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) survey (Appendix J). It includes patient perception about health care provider communication and discharge information.

As shown on Table 4 below, the following measures were to be assessed and analyzed using descriptive statistics, content and trend analyses since randomization of participants into a control group was not to be carried out in this project. The evaluation design for this project was a one-group pre-post test design. The main reasoning behind this design selection was to fulfill an ethical obligation to provide all stroke patients with evidence-based care in a timely manner. Additionally, capturing as many nurses as possible to educate and train about swallow screening and care so that these nurses can immediately apply these skills in the care of their clients was also deemed necessary.

Table 4.

*Data Collection Table*

<b>Variables</b>	<b>Instruments</b>	<b>Data Collection Point</b>	<b>Data Analysis</b>
<b>Process Measures</b>			
Nurse Perception	Nurse Survey using Likert Scale and Open Ended Questions via online/paper	Pre- and post-implementation	Descriptive Statistics and content analysis
Knowledge Post-education	Multiple Choice Test Questions	Immediately after online computer modules or live inservice presentations	Descriptive Statistics
Skills Proficiency for Nursing Swallow Screen Tool and other skills (oral care, etc.)	Skills Checklist	Immediately after skills demonstration and practice	Descriptive Statistics
Attendance to annual competency fair	Attendance Sheet	Post-implementation	Descriptive Statistics
Compliance with guideline and policy and procedure	EPIC Chart Audits	Monthly post initiation of practice change	Descriptive Statistics and Trend Analysis
Barriers to implementation	Suggestion Box or online/paper survey	Weekly post initiation of practice change	Content Analysis
Availability of program and swallow screen consultant 24-7	Record of approved consultants	Post approval to serve as shift consultants	Descriptive Statistics
<b>Outcome Measures</b>			
Patient and Family Satisfaction	Hospital approved patient and family survey such as HCAHPS	Post- implementation	Descriptive Statistics and content analysis
Incidence of Aspiration Pneumonia in Stroke Patients	Hospital's Quality Advisor Data Base and EPIC chart review	Post-implementation	Descriptive Statistics
Decreased LOS and readmission rate	Hospital's Quality Advisor Data Base	Yearly	Descriptive Statistics
Age-Adjusted Stroke Mortality Rate	Hawai'i Department of Health Data Base	Yearly	Descriptive Statistics

As a one-group pre-post test design, outcomes for program participants were to be compared before and after implementation of the program. Since mixed methods triangulation helps improve validity and demonstrate that the program contributed to the evaluation outcomes, both qualitative and quantitative data were to be collected in the form of nursing perception surveys, patient satisfaction surveys, knowledge and skills proficiency testing, and hospital data base reports via the Quality Advisor and Crystal reports and EPIC chart review.

Increased and sustained compliance to the patient care guideline and protocol was an important outcome for this project. The hospital data base reports via the Quality Advisor and Crystal reports were to help inform whether the project had an impact on these areas of care. The project site's director of patient safety and quality services, Cathy Adams, regularly monitored the number of hospitalized stroke patients with aspiration pneumonia and the number of readmissions for aspiration pneumonia via the hospital data base called the Quality Advisor using the Premier Advisory Software. This is a widely used evaluation tool with approximately 25% of US hospitals entering their data into this system for monitoring, reporting and reimbursement purposes. It can provide information on how well a hospital is meeting core measures set by organizations such as Medicare. Another data source that the hospital uses is the Crystal report which is linked to the hospital's electronic medical record (EMR). The hospital's quality coordinator can determine compliance with guideline and standards of care via nursing documentation in the EMR.

The projected timeline for the entire project was to begin with a successful proposal defense. This was to be followed by implementation, data collection, analysis, and interpretation; all of which are key steps in Titler's Iowa Model of EBP (Figure 4).

TASK	2014						2015				2016			
	J	A	S	O	N	D	January to December				January to December			
Successful Proposal Defense														
Brief Key Leaders & Staff														
Develop Marketing Products														
Prepare Instruments for Distribution														
Educate Staff														
In Progress Review														
Develop Database														
Implement Practice Change														
Collect Data														
Enter Data														
Analyze Data														
Interpret Data														
Written & Oral Defense														X
Prepare & Submit Dissemination Products														

Figure 4:

Proposed Timeline

### Ethical considerations

As outlined in the University of Hawai'i mandated Collaborative Institutional Training Initiative (CITI) course on human subject protection, basic ethical principles that were taken into careful consideration included respect for persons, beneficence and justice. Application of these principles involved informed consent, assessment of risk and benefits and appropriate selection of program participants. Since the care strategies for this project were already considered

standard, evidence-based practices, benefits did outweigh the risks. For the newly introduced bedside SST, there were concerns about validity and inter-rater reliability as nurses were now expected to conduct a procedure previously performed by the SLP. Careful selection of the SST was conducted by the organization and method of training to standardize the SST procedure was developed and implemented to maximize the benefits to patients and their loved ones.

Additionally, as a quality improvement (QI) project, there was no randomization of participants into control groups. All eligible participants were provided the same level of care as dictated in the project's list of interventions. Patient's rights to informed consent and privacy were honored in a similar manner as all patients admitted to the facility. As such, no additional consenting process took place and the right to refuse participation or withdraw from the project was respected.

### **Limitations**

As previously mentioned, the lack of a randomized control group threatened the validity of the project findings. However, triangulation of methods via the use of both qualitative and quantitative data helped enhance validity. Other limitations noted included the lack of control over variables. There were several stroke care interventions being implemented at the hospital while this project was taking place as Wilcox prepared for JCAHO PSC certification. Consequently, this posed a challenge in ascertaining if the interventions from this project alone led to the decrease in the incidence of SAP and age-adjusted mortality rate of stroke. Other variables that could affect incidence of aspiration pneumonia include the presence and management of co-morbid conditions such as diabetes which could diminish the client's ability to fend off infection. Lastly, the short time allotted for implementation and data collection may not be sufficient to accurately demonstrate the true impact this QI project had on reducing the

incidence of aspiration pneumonia in stroke patients. Therefore, further data collection and analysis may be needed to also ensure adoption and sustained practice.

## **Summary**

The human and economic toll of aspiration pneumonia in stroke patients is far too great to ignore especially for the County of Kaua'i where the age-adjusted stroke mortality rate is highest in the state. The formation of a JCAHO-certified PSC will help address the issues of access and quality of care so that more lives can be saved. Chapter three of this project discussed the steps that were to be taken to improve the delivery of care to stroke and TIA patients admitted to the hospital and diagnosed with dysphagia. Since dysphagia occurs in 42-67% of patients within three days of stroke, having other health care providers such as nurses trained to conduct bedside swallow screens is expected to enhance the care of stroke patients (Donovan et al., 2012).



## **Chapter 4. Results**

### **Introduction**

In preparation for the JCAHO primary stroke center certification visit, a dysphagia screening program was implemented at WMH. This involved hospital-wide training of nurses on how to conduct a swallow screen using the HPH tool already integrated into the hospital's EPIC EMR system. Having front line providers such as nurses become competently able to carry out this skill led to timely swallow screening of patients admitted with acute stroke. This prevented unnecessary delays in medication, fluids, and nutrition and decreased the risk of developing serious complications such as aspiration pneumonia. To be in line with the Iowa Model of EBP, the project implemented a pilot program with the nurses gradually adopting the practice over the months that followed. An evaluation of the process and outcome measures was undertaken to ensure sustainability of the screening practice. Process measures included knowledge and skills testing and compliance with the swallow guideline. Outcome measures included HCAHPS patient satisfaction scores and incidence of aspiration pneumonia in patients admitted with stroke. Finally, project goals also included monitoring of any possible impact on stroke mortality rates and costs of hospitalizations.

### **Description of sample**

**Patient sample.** Pre-interventional data covering a three-month period from January 2014 through March 2014 were obtained via the hospital's EPIC EMR chart review. The data were collected on 55 patients. The intervention phase of the project commenced on October 1, 2014 and ended once all of the nurses have completed their skills proficiency testing in December 2014. The final post-interventional data were collected from January 1, 2015 through

March 30, 2015. This data set also represented 55 patients. Table 5 reveals the age range and gender of the patient population. The diagnoses for these patients are shown in Table 6.

According to Lewis et al. (2014), stroke risk increases with age, doubling each decade after the age of 55 years. Although stroke can occur at any age, two thirds of all strokes occur in individuals older than 65 years of age. It is also more common in men but women are shown to have a higher mortality rate, perhaps due to women having a tendency to live longer than men (Lewis et al., 2014). For this project, the characteristics of the pre- and post implementation groups were similar. Most of the patients admitted with acute stroke were above the age of 60 years and there were a larger number of males than females. In addition to a primary diagnosis of acute stroke, each patient suffered at least one other condition that is a known predisposing factor to stroke including atrial fibrillation, hypertension (HTN), hyperlipidemia, diabetes mellitus, coronary artery disease, obesity and brain tumor. Other co-morbidities included Parkinson's disease, dementia, Alzheimer's disease, heart failure, chronic kidney disease, and alcohol abuse. For the different types of acute stroke, cerebral artery occlusion with cerebral infarction was the most common type of stroke suffered by the patient sample for this project. This was followed by transient cerebral ischemia.

Table 5 :

*Patient Age Range and Gender*

	<b>Pre-Intervention: (n=55)</b>	<b>Intervention Period: (n=54)</b>	<b>Post-Intervention: (n=55)</b>
	Jan. 2014 - March 2014	October - December 2014	January - March 2015
Age Range	47-94 years	34-92 years	23-102 years
Gender	Male = 28 (50.9%) Female = 27	Male = 31 (57.4%) Female = 23	Male = 35 (63.6%) Female = 20

Table 6 :

*Patient Primary Stroke Diagnoses*

	Pre-Intervention: N (%)	Intervention Period: N (%)	Post-Intervention: N (%)
Cerebral Artery Occlusion with cerebral infarction	28 (50.9%)	31 (57.4%)	26 (47.3%)
Cerebral embolism with cerebral infarction	4 (7.3%)	4 (7.41%)	1 (1.8%)
Occlusion and stenosis of carotid artery with cerebral infarction	1 (1.8%)	0 (0%)	0 (0%)
Intracerebral Hemorrhage	6 (10.9%)	4 (7.41%)	9 (16.4%)
Subdural Hemorrhage	1 (1.8%)	0 (0%)	0 (0%)
Subarachnoid hemorrhage	0 (0%)	0 (0%)	1 (1.8%)
Transient cerebral ischemia	15 (27.3%)	15 (27.8%)	18 (32.7%)
Total (percent)	55 (100%)	54 (100%)	55 (100%)

**Nurses sample.** As shown in table 7 below, a total of 149 nurses attended the competency fair training. This included those working in the emergency department (ED), intensive care unit (ICU) and the Medical-Surgical (MS) departments at WMH as well as nurses from Infusion Therapy and mother-baby care unit. Instructors from the Kaua'i Community College (KCC) Nursing Program also participated in the competency fair. Out of this total number, the target group of 102 nurses completed both the competency training and knowledge and skills proficiency testing. Twenty-seven of these nurses worked in the ED while 18 were

from the ICU and 49 from the MS units. One of the inpatient nurse educator and seven out of 10 supervisors also underwent both training and skills competency testing. There were four people on leave of absence and three who have transferred to different departments and were no longer providing direct patient care.

### **Evolution of project**

To prepare for the JCAHO visit and PSC certification, a stroke program committee was formed and the dysphagia screening team became a subgroup of this existing committee. The director of quality improvement who was also the project advisor for the team leader, identified dysphagia screening as an institutional priority along with the other components of the AHA Stroke care guideline. The details of the project were discussed during the monthly stroke meeting and approval was obtained to proceed with the project.

**Staff training.** Prior to skills assessment, the nurses were required to attend the competency fair and complete the HPH Healthstream Learning Center (HLC) stroke modules which included a section on dysphagia care. SLPs at HPH, who are content experts developed the HLC dysphagia module. The nurses at WMH were required to pass with a minimum score of 80% on the post-test and were permitted to retake the test as many times as needed in order to achieve this benchmark. Additionally, a competency fair was held to reinforce the content on stroke and dysphagia care and provide a live demonstration of the new swallow screening protocol. It was presented by the WMH SLP, John Harlacher, and the project team leader.

After viewing the swallow screening demonstration and practicing their skills on one another, the nurses were later asked to demonstrate competency using a skills checklist. This was carried out during work hours in their respective departments. If a patient in need of a screening was not available, the skill was conducted on a peer who role-played as a patient.

Another option used was to have the nurse champion or team leader who was doing the skills competency assessment play the part of the patient undergoing the screen. The team leader and nurse champions have been trained by the SLP to serve as consultants for this project.

During skills check-off, the nurse was permitted to use the swallow screen algorithm sheet as a reference since each nurse already had in his or her possession a copy of the swallow screen and dysphagia care protocol. Laminated copies were also placed in all patient care units in the ED, ICU, and MS floors. The hospital admitted approximately 18-20 patients with acute stroke a month so conducting a swallow screen was not a routine skill for nurses. Having an algorithm to refer to helped in refreshing their memory on how to conduct the swallow screening. Thus, allowing nurses to use the algorithm during their skill check-off was true to real life practice. After competency assessment, nurses were encouraged to verbalize any concerns and/or questions. The competency assessment for 102 nurses took approximately three months to complete which was the intervention phase of the educational program on dysphagia care (October-December 2014). During this time, the team leader, nurse champions and shift supervisors as well as the SLP were available to staff for support. A nursing perception survey about the project was later collected as part of the process improvement efforts (Appendix I).

Since the skills competency assessment occurred after the nurse has completed the in-service, the project leader carried out the EPIC electronic record data collection while in the patient care units waiting for an opportunity to check-off a nurse on the skill. Ideally, the skill was to be performed during shift work on an actual stroke patient, however, if no patient was available, a nursing peer could help role play a patient in need of screening. It was decided by both the project leader and SLP to allow the skill competency testing to be done on another

nursing peer role playing a patient if no actual stroke patient was available because of the small number of stroke admits and the time constraints of the project.

**Pre-intervention phase.** Pre-implementation nursing and patient data were collected (January-March 2014) prior to the annual competency fair held in late May 2014. It was deemed by the project advisor, who also was the quality improvement director, that consent from the hospital's institutional review board (IRB) was not necessary for this quality improvement project. The other departmental managers such as those from the lab, radiology, rehabilitation, were kept apprised of the project during the stroke committee's monthly meeting.

Nurses from ED and ICU completed an online Nursing Perception Survey to assess familiarization with current guidelines on prevention of aspiration pneumonia in stroke patients and self reported understanding of swallow screening. A compliance review was also conducted to collect nursing swallow screening practice data pre-intervention.

Patient data collected during this period included diagnoses and demographics (age and gender). The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) outcome measures were used to examine patient satisfaction. HCAHPS is a national, standardized, publically-reported survey of patients' perspectives of hospital care (Studer, Robinson & Cook, 2010). It was developed by the Center's for Medicare and Medicaid Services (CMS) and the Agency for Healthcare Research and Quality (AHRQ) and endorsed by the National Quality Forum (NQF). The survey questions measure frequency using the scale *never, sometimes, usually or always* with regard to:

- communication with doctors
- communication with nurses
- responsiveness of hospital staff

- pain management
- communication about medications
- cleanliness of hospital
- quietness at night of hospital

Additional questions whose answers are in other formats:

- discharge information —no to yes
- willingness to recommend —definitely no to definitely yes
- overall hospital rating —0 to 10 rating scale

**Intervention phase.** Data collection for the intervention phase of October to December 2014 took place after staff training was completed. Skills competency assessment for nurses commenced and transpired throughout the entire three-month period for a total of 102 nurses. Additionally, patient data was again captured including diagnoses, demographics (age and gender), and incidence of aspiration pneumonia/pneumonitis. A short trial period was implemented prior to adoption of practice change. Piloting the change in practice entailed several steps (Titler et al., 2001):

- selecting outcomes to be achieved,
- collecting baseline data
- developing a written EBP guideline
- trying the guideline on one or more units or with a number of patients
- evaluating the process and outcomes of the trial
- modifying the guideline based on process and outcome data

The team leader and nurse champions met regularly to discuss implementation issues and brainstorm with staff and managers on how to improve the process. Since the swallow screen flowsheet can only be found in the EPIC admission data base, it was vital for nurses to communicate whether it has been completed or not. The triage nurse in ED may not be able to conduct the screening right away but those assuming the care of the patient were taught to follow up on whether the screening was completed prior to administration of any oral medication, fluids or nutrition. In addition to having its own algorithm and protocol sheet, the swallow screen was also incorporated into the stroke code algorithm, stroke care pathway, and stroke order set as an essential part of the overall care of the acute stroke patient.

**Post-intervention Phase.** In the post intervention phase (January-March 2015), a final patient data collection occurred including diagnoses, demographics, incidence of aspiration pneumonia/pneumonitis, and patient satisfaction. The nursing surveys were collected from nurses in ED, ICU as well as MS after they have undergone training and competency assessment. Surveys in pen and paper form were made available in the nursing stations for each department so nurses can easily access them and submit them anonymously in a large brown folder. To encourage participation, gift certificates were offered in a prize drawing for the four patient care units. Seventy-three surveys during the post-intervention phase were returned which represented 72% of the total number of nurses trained.

Nursing compliance reviews of nursing swallow screening practice rates were also captured. As for patient satisfaction surveys, there were 28 patients with an admitting diagnosis of acute stroke who returned their HCAHPS surveys during July 1, 2014 and June 30, 2015. This is comparable with the total of 30 patients who returned the HCAHPS survey during the pre-intervention period of July 1, 2013 till June 30, 2014.



## **Data Analysis**

**Impact of the dysphagia screening program.** As a quality improvement project, descriptive statistics, in the form of counts and percentages, were used to summarize and report data. The metrics and benchmarks were approved by the WMH Quality Improvement team prior to the implementation of the project. The goal of the project was to develop and implement a formal dysphagia screening program where nurses are trained to screen patients with stroke for difficulty swallowing. Nurses are the most readily available health care staff in the hospital and thus, are the best candidates to conduct these screenings. An essential component of this project was to evaluate the cognitive, psychomotor and affective skills of these nurses after staff training has been provided.

The process measures involved pre-and post-interventional data on nurse perception, knowledge and skills proficiency and what impact these had on nursing practice and compliance to the dysphagia screening protocol.

**Nurse training and skills proficiency assessment.** As part of the hospital-wide effort to become a primary stroke center, nurses were required to complete the HLC stroke modules which included dysphagia care. After viewing the 30 minute video online, the nurse takes a post test consisting of 10 questions. In order to complete the module and earn continuing education (CE) credits, the nurse must score at least 80% and is permitted to retake the test as many times as needed to achieve this benchmark score. HLC does not keep record of how often a quiz is taken as long as the nurse eventually achieves the passing score of 80 percent.

Training included attending a swallow screening demonstration provided by the SLP and project team leader. There was a total of four sessions consisting of a two-day competency fair in May, then again in July and September to accommodate the nurses varying work schedules.

By October, all of the nurses who have completed the training were asked to demonstrate knowledge and skills proficiency using a skills checklist and algorithm sheet. As depicted in table 7 below, all of the nurses in ED and ICU were able to complete the training and skills proficiency assessment. Although nurses from the medical-surgical units also completed the training, only 92.5% (49/53) underwent the skills proficiency assessment conducted between October through December 2014 because several nurses needed to take a leave of absence or assume a different employment position. The nurses met the goal of 80% attendance to the training sessions and demonstrating knowledge and skills proficiency.

Table 7:

*Nursing Training & Competency Fair Attendance and Skills Proficiency*

ED (N=27)	ICU (N=18)	Medical-Surgical (N=56)	Other <sup>++</sup> (N=48)
<b>I. Nursing Training and Competency Fair Attendance (Benchmark 80%)</b>			
100% (27/27)	100% (18/18)	100% (56/56)	100% (48/48) <sup>++</sup>
<b>II. Face to Face Knowledge and Skills (Benchmark 80%)</b>			
100% (27/27)	100% (18/18)	92.5% (49/53)*	70% (7/10)** 50% (1/2) <sup>##</sup>

<sup>++</sup>Other =5 nursing instructors, 2 nurse educators, 7 supervisors from patient services administration and 34 nurses from infusion services and mother/baby care unit.\*4 nurses on LOA and 3 nurses no longer working on the floor. \*\*Supervisors; <sup>##</sup>Nurse Educators at WMH.

Abbreviations: LOA= Leave of Absence; ED=Emergency Department; ICU=Intensive Care Unit

**Nurse perception survey.** Prior to the implementation of the project, nurses in ED and ICU were the target sample group. The stroke committee later decided to have all of the nurses providing direct patient care to stroke patients undergo dysphagia training. As a result, only ED and ICU nurses were surveyed prior to implementation and it was not until after post-implementation that nurses in medical-surgical unit were surveyed. Another difference between the pre and post-surveys was that the pre-implementation survey was conducted online while paper and pencil were used for the post-surveys. By the time post-surveys were scheduled to be sent out, work-related email cannot be accessed by the nurses outside of the hospital. Furthermore, several of the nurses expressed preference for paper surveys so for post-implementation, this format was used.

Table 8 below represents the results of the pre- and post-implementation nursing survey. The goal of the survey was to evaluate for any changes in nursing perception and attitude about the practice innovation. Comparing the nurses' perception before and after training, there was an increase in familiarity, confidence and usage of the screening tool in the ED and ICU. Post-implementation results show a greater number of medical-surgical nurses expressing higher level of familiarity with the screening tool located in the EPIC admission data base (89%) than nurses in the ED and ICU (64%). With training and actual use of the screening tool during patient care, there was an overall positive response from nurses compared to before the project was implemented.

Table 8:

*Pre and Post-Implementation Nursing Perception Survey*

	Pre Intervention ED/ ICU online survey (n=22)	Post Intervention ED /ICU paper survey (n=36)	Post Intervention Medical-Surgical paper survey (n=37)
<b>Are you familiar with the current guidelines on how to prevent aspiration pneumonia in stroke patients?</b>			
1. Not or slightly familiar	1	0	0
2. Somewhat familiar	6	5	4
3. Quite/very familiar	15	31	33
<b>How confident are you in your ability to conduct a bedside swallowing screen?</b>			
1. Not or slightly confident	3	1	0
2. Somewhat confident	10	1	2
3. Quite/very confident	9	34	37

	Pre Intervention ED/ ICU online survey (n=22)	Post Intervention ED /ICU paper survey (n=36)	Post Intervention Medical-Surgical paper survey (n=37)
<b>Have you received training on how to conduct a bedside swallow screen?</b>			
Yes	4	36	37
No	18	0	0
<b>Are you familiar with the nursing swallow screening tool in the EPIC admission data base?</b>			
1. Not or slightly familiar	9	4	1
2. Somewhat familiar	5	9	3
3. Quite/very familiar	8	23	33
<b>Have you used the nursing EPIC swallowing screening tool?</b>			
Yes	5	23	25
No	17	13	12

**Nursing screening practice.** Along with the increase in confidence and familiarity with the swallowing screening tool came a rise in usage and compliance with the screening protocol. This was made evident by the results of the EPIC chart review conducted by the project team leader prior to, during and after implementation of the swallowing screening educational program. Prior to implementation, use of the HPH swallow screening tool ranged from 38.8% to 44.4%. Although 18% (4/22) of the nurses in ED and ICU revealed on the pre-implementation survey that they have received training on how to use the swallow screen while employed at a different hospital, a significant number, 82% (18/22) were still in need of training which could help explain the limited use of the tool as demonstrated below on Table 9.

During the intervention period of nursing skills proficiency assessment and teaching reinforcement, rate of screening rose to 66.7% in October, 75% in November, before dropping back down to 60% in December. EPIC chart review revealed that patients whose neurological symptoms have resolved by the time they presented in the ED were not being screened. In spite of the resolution of their symptoms, however, these patients were later diagnosed as having suffered a stroke with 50-62.5% admitted for TIA. The results were shared with the stroke team and the AHA guideline on swallow screening was reinforced with reminders during morning huddles and staff meetings to conduct the swallow screening on all patients with acute stroke and TIA prior to oral intake. The nurse champions in each of the nursing departments were crucial players in changing behavior. They helped to reinforce the educational content and serve as supportive resource persons for the nurses.

Once all of the nurses have undergone the skills proficiency assessment and the AHA guideline reinforced, the screening rate steadily climbed from 76.5% in January, 80% in February and 83.3% in March. The steady rise in screening was also partly due to the inpatient

nurses in ICU and MS floors following up on whether the swallow screen has been completed in the ED. If it has not yet been performed, the admitting inpatient nurse conducts the screening with or without a physician order. The nursing swallow screen is included in the stroke order sheet but this order sheet is only used when a stroke code is called in the ED for patients who are deemed candidates for thrombolytic therapy. As a result, not all patients diagnosed with stroke received a physician order for swallow screening. It was important to remind nurses that although an SLP consult would require a physician order, a nursing swallow screening does not. Additionally, physicians should always be kept apprised of changes in patient status, including the ability to swallow.

The EMR location of the swallow screen may have also been a factor in the low compliance rate at the beginning of the project. The SST was strategically placed in the admission data flow sheet for ED nurses to ensure that swallow screening is done prior to any oral intake. However, if stroke symptoms develop or worsen during hospitalization, inpatient nurses have no access to the SST in EPIC. Prior to initiation of the project, a request to the EPIC committee was made to have additional copies of the SST be made available in the inpatient flowsheet so other nurses providing stroke care can document any changes in patient swallowing status. The project team leader also suggested the creation of a smart phrase to be used on the progress notes to help simplify nursing documentation of findings.

EPIC chart reviews were periodically conducted to monitor the nurses' compliance with the AHA guidelines and the hospital's policy and procedure. Table 9 shows the percentages of stroke patients who underwent screening for dysphagia with an evidence-based bedside testing protocol approved by the hospital before being given any food, fluids, or medication by mouth. The findings from the compliance reviews were reported to the hospital stroke team and AHA

stroke guideline teaching was reinforced. This led to a steady rise in compliance rate during post-intervention period.

Table 9:

*Pre and Post Intervention Compliance Reviews of Nursing Swallow Screening Practice*

	Pre Intervention January-March 2014	Intervention October-December 2014	Post Intervention January-March 2015
Month-1	38.8% (7/18)	66.7% (12/18)	76.5% (13/17)
Month-2	44.4% (8/18)	75% (12/16)	80% (16/20)
Month-3	42% (8/19)	60% (12/20)	83.3% (15/18)
Total Average	41.8% (23/55)	66.7% (36/54)	80.0% (44/55)

**Incidence of aspiration pneumonia/pneumonitis.** The American Thoracic Society (ATS) classifies hospital-acquired pneumonia as occurring 48 hours or longer after hospital admission and not incubating at time of hospitalization. As demonstrated in Table 10 below, the incidence of aspiration pneumonia was significantly higher prior to implementation of the dysphagia screening program. There were a total of five patients with a diagnosis of aspiration pneumonitis/pneumonia between the months of January through March 2014. Two patients were unscreened while the other three failed screening but were placed on modified diets of thickened liquids and pureed diet.

During the intervention and post-intervention periods, there was a decrease in the incidence of aspiration pneumonia/pneumonitis rate as swallow screenings increased among nurses. There was one incidence of aspiration pneumonia during each of the three-month



periods of October through December 2014 and from January through March 2015. Both of these incidences occurred in patients who were screened but failed and were subsequently placed on a modified diet. There were no unscreened patients with aspiration pneumonia during the intervention and post-intervention period.

Table 10:

*Incidence of Aspiration Pneumonia/ Pneumonitis\**

	Pre-Intervention January-March 2014 (n=55)	Intervention October-December 2014 (n=54)	Post-Intervention January-March 2015 (n=55)
Month-1	3	0	0
Month-2	0	0	0
Month-3	2	1	1
Total	5/55 (9%)	1/54 (1.85%)	1/55 (1.82%)

\*Diagnosis >48 hours post admission

To assess costs of aspiration pneumonia on hospitalization, Wilson's (2012) average marginal costs were used. According to Wilson (2012), the average marginal cost of pneumonia on hospitalization is approximately \$27, 633 (95% CI, \$27,078-\$27,988). As depicted in Table 11, there was a reduction in hospitalization costs in the intervention and post intervention phases of the program.

Table 11:

*Incidence of Aspiration Pneumonia/Pneumonitis and Hospitalization Costs*

Pre-Intervention January-March 2014 (n=55)	Intervention October-December 2014 (n=54)	Post-Intervention January-March 2015 (n=55)
\$27, 633 X 5 = \$138,165*	\$27, 633 X 1 = \$27, 633*	\$27, 633 X 1 = \$27, 633*

\*Source: Wilson (2012)

**Patient and family satisfaction survey.** The Health Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey was used to measure patient satisfaction of care. Table 12 shows the sample size for each time period is small, however, they are comparable with 30 patients returning the survey between July 2013 through June 2014 and 28 patients returning the survey between July 2014-June 2015, when the dysphagia screening program was first introduced and integrated into the patient care process at Wilcox Hospital.

Findings in Table 12 below reveal that the overall rating from patients admitted with stroke went down slightly from 83.3% to 78.8%. Overall rating is derived from a patient's general evaluative perspective of the hospital using the scale of 0 as worst hospital possible to 10 as the best hospital possible. This is the culmination of every encounter the patient has had from admission to discharge, and is highly correlated with the three HCAHPS composites: nurse communication, pain management and responsiveness of staff (Studer, Robinson & Cook, 2010). While the responsiveness of staff also experienced a slight decline, ratings for nurse communication and pain management showed improvements over a period of one year.

Responsiveness of the staff category examines how often patients received quick help from any hospital staff whereas the survey category of nursing communication measures how

well nurses communicated with patients during their hospital stay. Despite the drop in responsiveness of staff, scores for other areas of patient care that nurses are directly responsible for showed improvements. The nurses' scores rose in the area of treating patients with courtesy and respect, listening carefully and explaining in a way that the patient could understand during the implementation of the nursing swallow screen project and other primary stroke care measures. The HCAHPS data for the general patient population admitted at WMH versus patients with acute stroke were also examined as shown in Table 12. Although the overall rating for patients with acute stroke showed a four and a half percent decline over the past year, this rating was still two and a half percent higher than Wilcox Hospital's overall rating for all patients admitted to the facility.

Table 12:

*Comparisons of HCAHPS in Patients with Stroke DRGs and All WMH Patients*

	<b>Pre-intervention 7/1/13-6/30/2014</b>	<b>Post-intervention 7/1/14-6/30/15</b>
<b>Patients with Stroke DRG</b>		
	(N=30)	(N=28)
Overall Rating	83.3%	78.8%
Nurse Communication	77.1%	82.1%
Responsive of Staff	79.6%	75.7%
Pain Management	66.7%	81.2%
Communication about medications	52.4%	55.0%
Discharge Information	89.0%	92.4%

	<b>Pre-intervention 7/1/13-6/30/2014</b>	<b>Post-intervention 7/1/14-6/30/15</b>
<b>All WMH Patients</b>		
	(N=773)	(N=738)
Overall Rating	73.6%	76.3%
Nurse Communication	82.2%	84.4%
Responsive of Staff	69.2%	74.3%
Pain Management	74.6%	74.5%
Communication about medications	68.0%	66.9%
Discharge Information	86.2%	86.5%

*Definitions: DRG=Diagnosis-Related Group*

## Summary

With the Iowa Model of EBP serving as guide, the implementation of this quality improvement project began after a week-long pilot period demonstrated feasibility of the process. The intervention period lasted for three months and involved continuous reinforcement of educational content and provision of support for the staff by nurse champions in each of the patient care unit. Despite dysphagia swallowing screening not being a routine part of nursing care in the ED, ICU and medical-surgical floors, majority of the nurses expressed increased awareness, confidence and application of their newly adopted clinical skill.

According to Reker et al. (2002), process of care as measured by guideline compliance is positively and significantly associated with greater patient satisfaction. Therefore, it did not come as a surprise to discover the rise in HCAHPS scores in the area of nursing communication during and after the implementation of this project and other care elements of the AHA acute

stroke guideline. Data collected revealed attainment of the project's expected outcomes which were to have nurses trained to competently conduct swallowing screening and comply with the dysphagia protocol. Incidence of aspiration pneumonitis and pneumonia amongst patients with acute stroke decreased as nurses carried out swallow screenings more consistently. As shown in previous studies, clinician's adherence with screening swallowing improve when protocols are put in place and this in turn leads to reduction in morbidity, mortality and health care costs (Daniels et al, 2013).

## **Chapter 5. Discussion**

### **Introduction**

Following the Iowa Model of EBP, a formal dysphagia screening program was integrated into WMH as the hospital prepared for JCAHO PSC certification. The goal was to increase the use of a nurse-administered SST through interdisciplinary collaboration and educational training. Once the nurses demonstrated greater awareness, knowledge and skills proficiency in administering swallowing screenings, the number of patients screened for dysphagia rose and the rate of aspiration pneumonia fell. This meant greater cost savings for the hospital not only in terms of financial gains but more importantly, human lives saved as the quality and access to stroke care were enhanced. This final chapter contains a discussion of the findings and implications and plans for dissemination.

### **Interpretation of findings**

The clinical question for this project was: Will a formalized dysphagia program at WMH lead to increased guideline compliance and improved patient outcomes? As illustrated in the frequency and percentage tables, there was a positive correlation between swallow screening and stakeholder perception of care. Findings revealed an increase in satisfaction levels of nurses and patients when the number of swallow screenings rose in frequency. The incidence of aspiration pneumonia, on the other hand, demonstrated an inverse relationship with the swallowing screening practice of nurses. This was reflected by the downward trend of aspiration pneumonia cases as nurses performed more swallow screenings on patients admitted for acute stroke.

**Nurse training and skills proficiency assessment.** When planning implementation, Cullen and Adams (2012) stressed the importance of creating awareness and interest, building knowledge and commitment, promoting action and adoption, and pursuing integration and

sustainability. To build awareness and interest, advantages of the EBP and its compatibility with the values of the group were highlighted during staff training. Nurses were encouraged to share their concerns and questions about the innovation during the annual competency fair, staff meetings and daily morning huddles. Once the definition of swallow screening and the role of the nurse in conducting swallow screens were clarified, the nurses became more receptive to performing the procedure on clients. A collaborative partnership was formed between the SLP and nurses as a formal dysphagia program was put into place at WMH.

For assembling knowledge and commitment, the nurses were asked to complete the required inservices on stroke and dysphagia and demonstrate skills competency. Since the dysphagia program was an integral part of the systemwide effort to prepare for the PSC certification, all of the nurses were scheduled to participate in the dysphagia care training. Majority of the nurses were successfully trained to demonstrate knowledge and skills proficiency. Nursing champions in each of the patient care units providing support and guidance were vital to the program's success. The tools used to promote action and adoption included protocol algorithms, skills checklist, and CE credits earned by completing the HLC stroke modules.

Pursuing integration and sustainability meant injecting the principles of dysphagia care into the regular nursing care routine at WMH. After each nurse completed his or her HLC module with a passing score, he or she participated in the competency fair for skills demonstration and hands on application. All of the nurses in ED and ICU completed the training while 92.5% of nurses did from the MS units. By the time nurses were scheduled for skills testing, they have undergone knowledge and skills training on stroke and dysphagia care. The nurses were each given copies of the skills checklist and dysphagia care algorithm in preparation

for their skills assessment. Once the nurse was prepared for check off, ideally on an actual stroke patient recently admitted to the hospital, the nurse informed the project leader or one of the nurse champions to conduct the skills assessment for dysphagia screening.

The existing SST in the EPIC EMR was developed by SLPs at HPH. To reinforce the dysphagia care principles, the project team used educational resources consisting of online HLC dysphagia care module, competency fair, SLP expertise, algorithms, and the stroke clinical pathway. A folder containing all of the written educational material was placed in each of the nursing stations for nurses to use as reference. They also have unlimited access to the HLC dysphagia module and online resources such as Up to Date clinical decision support system and the Lippincott Nursing Skills.

The expected outcomes for knowledge and skills testing were met. All of the nurses achieved the minimum passing knowledge test score of 80% on the HLC dysphagia care module and 98.3% of nurses demonstrated proficiency in conducting swallow screens which also had a benchmark of 80%. For future training, WMH may want to again look at other SSTs and update their current one as needed. Training can also be extended to other HPH clinical sites. Nursing instructors and students on the RN track are good candidates for training since they will participate in the care of stroke patients while doing clinical at WMH. During the annual competency fair at WMH, use of a computer as part of training to ensure nurses can identify SST location and document findings in EPIC should be planned in addition to reviewing the SST protocol algorithm.

**Nurse perception survey.** The nursing perception survey was reviewed by three content experts prior to dissemination: the SLP, the ED and ICU manager and stroke committee director and finally, the quality improvement director. Return rate was enhanced by using the nurses'



preferred method of paper and pencil survey and providing incentives such as gift certificates for those who successfully completed the skills check off and filled out an anonymous survey.

Comparison of the pre- and post-implementation survey results was possible for the ED and ICU nurses because, as the original target sample for this project, they were surveyed prior to project implementation. The nurses from the MS units were later added to the sample group after the stroke committee decided to instead have a system wide training for nurses. As expected, the nurses expressed greater familiarity, confidence and usage of the tool after participation in the SST training.

By the end of training and skills assessment, at least half of nurses from ED, ICU and MS who responded to the survey have not yet used the SST flow sheet in the EMR. Due to the limited number of stroke admissions, there were few opportunities to conduct swallow screening on actual patients and document the results in the SST EMR flowsheet. Regularly scheduled inservice and competency fair should be provided to help nurses retain their newly learned skills. Continuous collaboration between the nurses and SLPs should also be encouraged as SLPs have the expertise in dysphagia care and would serve as great resource for nurses who are at the bedside providing direct patient care around the clock. The positive results of this survey after project implementation demonstrate that changes in knowledge, awareness and attitude can improve practice.

**Nursing screening practice.** Literature has shown that when a swallowing screen protocol is implemented, there is improvement in clinician's adherence with screening. As evidenced by the results of this quality improvement project, this was also the case for the nurses at WMH. Although there were fluctuations in the compliance rate, it never dropped back down to the pre-implementation levels. The educational portion of the project was completed prior to

the start of the skills competency testing in October, 2014. The screening practice compliance rate was monitored during the skills testing period of October till December 2014. Compared to the pre-implementation rate of 38.8%, screening rate rose to 66.7% in October and 75% in November. In December, however, it dropped down to 60% in spite of the completion of the nurses' skills testing. The drop in rate can be explained by the nurses electing to forego screening patients whose symptoms have resolved upon ED arrival but were later diagnosed with stroke or TIA.

When a patient's neurological symptoms resolve by the time he or she present to the hospital, the nurses may choose not to screen swallowing until they receive confirmation from the physician that the patient indeed suffered acute stroke. The SST can take up to 10-15 minutes to administer and the nurses in the ED may have other competing care processes to complete. Additionally, the SST flow sheet location in the EMR may have also played a role in the low compliance rate. It was located in the admission data base. There was no inpatient flow sheets for nurses to document swallow screening for a patient whose neurological status may have changed during the course of hospital stay. Instead, nurses were documenting in the progress notes while awaiting EMR updates. A request was made to the IT and EPIC committee for additional locations for the SST flowsheet in EPIC and possibly, use of smart phrase in the progress note section to allow for easier documentation.

With audit and feedback, the stroke committee and nursing staff were kept apprised of the project's progress. Teaching was reinforced highlighting AHA Stroke guidelines on screening. Each staff member completed the HLC module and received a one to one meeting with project leader and/or change champion prior to and during skills evaluation. Additionally, the annual competency training sessions were conducted in small groups to allow for more

individualized attention. The project was endorsed by the hospital administration since the hospital was preparing for JCAHO PSC certification.

The compliance rate after audit and feedback improved with a steady rise at 76.5% in January to 80% in February and 83.3% in March 2015. This did not meet the 100% benchmark for this project. However, another QI project implemented in the ED by Daniels et al. (2013) achieved a rate of 80.8% as its highest compliance rate. Barriers identified included: difficulty finding time to document screening results in the EMR; difficulty recalling all screening items during SST administration; inconsistent administration of the SST; and inaccurate interpretation of screening items (Daniels et al., 2013). This project also encountered the same barriers and these were dealt with using educational reinforcements, change champion support and integration into the nursing daily practice. After project implementation targeting patients with acute stroke, it has become apparent that patients suffering from other conditions such as Alzheimer's and Parkinson's disease can also benefit from swallow screening procedures. With additional time and reinforcement, staff may be able to eventually achieve the 100% nursing screening benchmark.

**Incidence of aspiration pneumonia.** Incidence rate of pneumonia based on screening practice and results showed similar trends as prior reports found in the literature review. Incidence declined as screening frequency rose. Those who developed aspiration pneumonitis or pneumonia were patients who were not screened or who failed screening. As noted by Lakshminarayan et al, (2010), unscreened patients have higher pneumonia rate than screened patients (4.2% versus 2%). Those who were screened and failed are also at high risk for pneumonia. There were a total of 5 incidences of pneumonia prior to project implementation with two of these patients unscreened for dysphagia while the rest failed screening and placed on

modified diet. There was a considerable drop after implementation to just one case of aspiration pneumonia during a 3-month period. There were no unscreened patients developing pneumonia post-implementation of QI project.

Earlier study findings by Hinchey et al. (2005) demonstrated similar trends of pneumonia rates at sites with a formal dysphagia screen being lower at 2.4% versus 5.4% ( $p=0.0016$ ) at sites with no formal screen. It was concluded that a formal dysphagia screen prevented pneumonia even after adjusting for stroke severity (Hinchey et al., 2005). With the 79.4-79.8% decrease in aspiration pneumonia rate after dysphagia program implementation at WMH, these preliminary results will lead to cost savings and even more importantly, the mortality and morbidity rates should also take a downward turn since pneumonia is associated with a greater than 5-fold increase in mortality (Masrur et al. 2013). The most recent adjusted mortality rate available for the island of Kaua'i was for the years 2011-2013 and although there has been a decline, the rate remained high at 36%, still above the Healthy People 2020 benchmark of 34.8% (Hawai'i State Department of Health, 2015).

The findings of this project support previous study results showing a decrease in morbidity, mortality and health care costs with dysphagia screening. Pneumonia rates dropped as screening practice improved among nurses. The HPH SST was developed by SLPs, who are content experts. Future studies should aim to determine the psychometric value of HPH SST using experimental studies. Lastly, studies may also include how a formalized dysphagia screening program could impact other patients with difficulty swallowing such as those with Parkinson's Disease or dementia.

**Patient and family satisfaction survey.** HCAHPS is a standardized survey instrument that measures patients' perspectives of hospital care. The survey has three goals: 1) produce comparable data to allow objective comparisons among hospitals on topics important to the public, 2) public reporting of the survey results to serve as an incentive for hospitals to improve quality of care and, 3) increase transparency to enhance public accountability (CMS, 2014). Patients eligible to participate are those equal to or above the age of 18 and have at least made one overnight hospital stay. They are surveyed between 48 hours and six weeks after discharge via mail and/or telephone. HCAHPS does not permit interviews or distribution of the surveys while the patient is still hospitalized. The Centers for Medicare and Medicaid Services (CMS) analyzes the results and calculates the HCAHPS scores before publicly reporting them on the Hospital Compare website (CMS, 2014).

The overall HCAHPS hospital rating is highly correlated with three of the survey's composites: nurse communication, pain management and responsiveness of staff. There was a rise in ratings for nurse communication and pain management. For nurse communication, the survey asks patients about their perception of nursing care during their hospital stay. Since this was a nurse-administered swallow screening program, this aspect of the survey is pertinent to the evaluation of the EBP's effectiveness. Using the frequency scale of *never, sometimes, usually or always*, patients are asked to rate the following questions (Studer et al., 2010):

- During this hospital stay, how often did nurses treat you with courtesy and respect?
- During this hospital stay, how often did nurses listen carefully to you?
- During this hospital stay, how often did nurses explain things in a way you could understand?

Return rate of the survey was low but did not change from previous years. With an approximate 216-220 stroke admissions a year for WMH, only 12.9-13.8% of patients returned the survey. HCAHPS is a validated tool with standardized collection process. Their method of waiting until 48 hours to six weeks before surveying patients via mail or telephone may have contributed to the low return rate. Although WMH rely on HCAHPS data to monitor patient satisfaction, it is important to note that the results only reflect less than 20% of the patient admitted to the facility.

### **Effectiveness of the marketing plan**

Adoption of an innovation occurs over time for members of a social system (Rogers, 2003). Nurses were the target users of this innovation. As an important stakeholder group, the plan was to engage the nurses into a discussion about the project prior to and during implementation. An online survey was sent out to ED and ICU nurses to gather their opinion about swallow screening. Majority of the nurses lacked knowledge about swallow screenings and were unclear about the difference between screenings versus evaluations conducted by SLPs. During the annual competency fair, a distinction between the two was made and a poster board highlighting the benefits of swallow screening and the role nurses play in the dysphagia screening program was presented to help allay fears and concerns. Developing this partnership with the nurses was in itself, an effective marketing strategy. Their active involvement was crucial to the success of this program. Change champions were selected from each unit and trained to serve as consultants for this project. Each nurse received a copy of all educational materials, and CE credits for completing the HLC stroke module. During one-to-one meetings, the swallow screen algorithm and checklist were reviewed and once the RN felt prepared to

demonstrate competency, skills testing took place. Remediation was made available when needed.

To ensure adoption and sustainability, this project demonstrated the need for using multiple modalities in educating nurses about a new innovation. Structuring the workflow and regularly evaluating for areas that need adjusting helped ensure adherence. With the use of these strategies, nurses were more apt to embrace and adopt the new process.

### **Limitations**

As a quality improvement project, there were limitations in regards to the validity and reliability of the tools used for measurement. Nursing survey was administered to ICU and ED nurses only prior to implementation so this impacted the comparison of survey results for nurses in the MS units. There were a few nurses who resisted the change but once definitions of screening and evaluation were clarified, they became more receptive to the change in practice. Presenters at the competency fair shared important statistics with the nurses and encouraged the nurses to also share their thoughts and feelings about the topic. One nurse told a story about her father who died of aspiration pneumonia post-stroke and how she believed that having an SST could have helped prevent her father's death. Providing this opportunity for staff discussion helped reinforce key principles and validate the implementation of the project.

Other limiting factors included the low return rate of the HCAHPS surveys and simultaneous implementation of other stroke care projects made it difficult to determine the true impact of this dysphagia care project. Additionally, there were only a few opportunities for nurses to conduct the swallow screening on actual stroke patients so skills assessment had to be done with a fellow nurse role-playing the patient. Previous reports recommended skills assessment on real patients, however, time constraints of the project pointed to a need for a

different approach which was approved by the SLP, as content expert. Those who performed the skills assessment on the nurses have been trained by the SLP.

Finally, EPIC medical record abstraction was used to evaluate measures. Due to the SST's designated sole location in the EPIC admission data base, nurses outside of the ED needed to find other locations in the EMR to document their screening results such as in the progress notes and education flow sheet. This made collecting data challenging and time consuming. Suggestions for possible locations for SST flowsheet expansion were given to the EPIC committee.

## **Implications**

**Scientific underpinnings of practice.** Care of stroke patients continue to evolve with research. Literature identified numerous SSTs being used in the care of stroke patients. The dysphagia invitational conference proceeding announced that dysphagia screening is not a “one size fits all” process (Donovan et al., 2013). The K-T Matrix could be utilized, as evidenced in this project, in selecting a valid and reliable SST that would best suit the needs of the institution. Although most SSTs contain an initial clinical assessment followed by a water swallow test, they differ in validity which is measured by sensitivity and specificity. Further research is needed to identify a set of standards that constitute a valid dysphagia screening tool using experimental design.

**Organization and systems leadership for QI and economics.** The organizational priority for WMH was to become a JCAHO certified PSC. There was a system wide effort to put into place PSC elements in preparation for the JCAHO visit. A stroke committee was formed to plan and implement care strategies outlined in the AHA/ASA GWTG stroke. As a quality improvement project, the formalized dysphagia screening program demonstrated



effectiveness in reducing the incidence of pneumonia which in turn, resulted in improved quality of care and cost savings.

**Evidence-based practice.** Dysphagia screening has been established as best practice in the care of stroke patients as outlined in the AHA/ASA GWTG stroke guideline, yet, many institutions have yet to adopt this evidence-based practice as a standard part of patient care (Daniels et al., 2013). The outcomes of this project demonstrated that a formalized dysphagia screening program taught to nurses using a multimodal educational program helped enhance the nurse's knowledge, confidence and usage of the HPH SST. As a result, there was improved practice compliance and a subsequent decrease in dysphagia complications such as aspiration pneumonia. This underscores the importance of incorporating evidence-based practice such as a dysphagia screening program into the care of patients.

**Information systems technology.** According to Titler (2007), "evidence base should be brought to point of care by way of computer software that integrates evidence and clinical decision making" (p. 27). The HPH SST has been incorporated into the EPIC EMR admission data base flow sheet to promote swallow screening in the ED during triage or admission. However, nurses have identified the need for additional SST flow sheets to be made available at multiple sections of the EMR since clients can develop difficulty swallowing anytime during hospitalization. This was suggested to the HPH EPIC committee along with developing a Smart Phrase to provide nurses charting guidance when documenting swallow screening on the progress notes. Having these charting spaces appropriately placed and available for nurses to document their findings will help promote compliance and improve patient care delivery.

**Health care policy and ethics.** With stroke being the fourth leading cause of death in the US, latest improvements in patient care show that development of stroke centers improves

morbidity and mortality rates. The Hawai'i Department of Health Plan for the Prevention of Heart Disease and Stroke (2011) revealed that stroke mortality rates were disproportionately higher for residents living in the counties of Hawai'i and Kaua'i. In order to achieve the Health People 2020 goal, the DOH prevention plan aimed to support development of timely, high quality coordinated system of care for early detection, emergency response, and treatment for cardiovascular disease events regardless of geographical location (DOH, 2011). A need for the formation of primary stroke centers and increased adherence to the AHA GWTC stroke have been identified as important strategies to lower the state's stroke mortality rates. This project's aim was to assist in the PSC certification of WMH by developing and implementing a formalized dysphagia screening program. With annual costs for stroke in the US exceeding 73 billion dollars, health care policy and ethics should focus on ensuring that patients are receiving evidence-based care.

**Interprofessional collaboration.** In the past, swallow screenings have been conducted in a non-standardized fashion and usually by the SLP, an expert in swallowing disorders tasked with carrying out screenings on large number of patients. ASA/AHA guidelines state that initial swallow screenings can be safely carried out by other health care providers (Jauch et al., 2013). For this QI project, the nurses, as frontline care givers, were selected to be trained to conduct swallow screenings. To ensure that proper training is provided, the SLP, as content expert, assisted in developing the formalized dysphagia screening program. The SLP also worked alongside the project leader in providing inservice during the annual competency fair and training individuals such as the change champions to serve as additional support consultants.

**Prevention and population health.** Early detection of dysphagia via screening allows for immediate intervention that reduces mortality, morbidity, length of hospital stay, and

healthcare costs (Daniels et al., 2013). The AHA/ASA guideline recommends assessment of swallowing before the patient begins eating, drinking or receiving oral medications (Jauch, 2013). This project aimed to lower the incidence of stroke-associated pneumonia which contributes to the high costs of care and lives lost. Swallow screening, as a preventive measure, helped identify a patient in need of further swallowing evaluation by the SLP. The SLP then prescribes a diet that is suitable for the patient's swallowing ability. Involvement of family members was encouraged as client prepares for discharge. Communication boards in each of the patients' rooms were used to serve as reminders for health care staff and family members about patient's swallowing ability and diet prescription. Adherence to patient's prescribed diet was an important preventive measure of aspiration pneumonia as well as poor nutritional intake.

**Advanced nursing practice and education.** The findings of this project demonstrated that the involvement of change champions, opinion leaders and expert consultants are essential in promoting adoption of an EBP. Also having positive impact on the project are the combination of interactive education and practice reinforcing strategies such as audit and feedback. The project leader and change champions worked collaboratively with the SLP to ensure that the educational program contained the necessary information for nurses to learn in order to become competently able to screen swallowing in stroke patients. Cullen and Adams (2012) stressed the importance of identifying change agents early, obtaining their support, providing education regarding the practice change, and clarifying their roles to facilitate effective use of team members' strengths and connections in the organization. This was carried out during this project with change agents in each unit reinforcing the new innovation to promote adoption and sustainability. Having a core group of trained change agents available to cover all shifts helped

meet clinicians' needs and build expertise as clinicians seek answers through interactions with colleagues (Cullen and Adams, 2012).

According to Titler (2007), education does little to change practice behavior. Instead, the combination of interactive education (such as discussion groups) and other practice-reinforcing strategies (such as audit and feedback) have been found to have more positive effects on improving EBP than education alone (Titler, 2007). This project helped support Titler's conclusions about implementing and sustaining practice change. The outcomes demonstrated that nurses can be taught to conduct swallow screening on patients with acute stroke prior to any oral intake. In addition to the staff nurses at WMH, training was also provided to nursing faculty and RN students at Kaua'i Community College (KCC) since they attend clinical rotations at WMH and have contact with patients in need of swallow screening.

### **Strategies for sustaining change**

Dysphagia screening is an essential part of the AHA/ASA Acute Stroke Care Guideline and despite the lack of one standardized SST, dysphagia screening protocols should include SSTs with evidence-based swallow screening items (Jauch et al., 2013). A formal dysphagia screen was defined as a checklist of risk factors for aspiration followed by a water challenge if client does not exhibit the risk factors (Hinchey et al., 2005). An SLP consult is made if client fails the screen. Without a formalized dysphagia program, patients are selectively screened based on stroke severity and those left unscreened were found to be at a higher risk of pneumonia compared to those who underwent screening (Lakshminarayan, K. et al, 2010).

A formal dysphagia screening program at WMH was an integral part of the PSC care elements and as such, has been integrated into the patient care systems such as EPIC EMR, stroke order sheets, care pathway, protocol and guidelines. It will be offered during WMH

annual competency fair to ensure that nursing swallow screening skills are kept updated. The SLP and change champions will continue to serve as swallow consultants and a dysphagia care handbook and other resources are available in each unit for nurses to refer to for information.

### **Plans for dissemination**

Submission of this paper and final defense are planned for the end of 2016. The hospital's stroke committee and nursing staff have been kept apprised of the results of the project. Even after the completion of the project, the dysphagia screening program continues to be used at WMH since the facility has become a JCAHO certified PSC and compliance rates remain high according to director of the quality improvement department (Adams, 2016). Other facilities caring for patients in need of swallow screening have expressed interest in adopting a formal dysphagia screening program. The skilled nursing facility at Garden Island Health Care on the island of Kaua'i has a short-term rehabilitation unit and their speech pathologist has agreed to collaborate on a project that would train nurses how to screen for dysphagia. The state hospital, Kaua'i Veteran's Memorial Hospital (KVMH) has also voiced an interest in implementing a nursing dysphagia screening program at their facility. Lastly, dysphagia care and screening has been incorporated into the nursing curriculum at KCC RN nursing program.

### **Conclusion**

An essential first step to ensure prevention of dysphagia-related complications is to screen all patients with stroke for signs of swallowing impairment prior to oral intake (Daniels et al., 2013). The American Heart Association/American Stroke Association (AHA/ASA) included swallow screening prior to administration of food, liquid or medication in individuals presenting with stroke symptoms as part of their guidelines on the early management of adults with acute stroke. This project implemented a dysphagia screening program consisting of an SST deemed

by the institution to be valid, reliable and feasible in meeting the needs of patients and health care staff. System wide training followed and resulted in improvements in dysphagia screening practice and patient care outcomes.

This quality improvement project was designed to develop a dysphagia screening program at Wilcox Memorial Hospital and increase nursing knowledge, confidence and usage of the HPH SST and thus, compliance to the AHA/ASA acute stroke guidelines in preparation for the JCAHO PSC certification. After selection of a valid and feasible SST, numerous evidence-based strategies were used to train nurses and ensure effectiveness, reliability and sustainability of swallowing screening skills. Findings revealed that a dysphagia screening program for nurses led to improved patient outcomes at WMH. The findings underscore the value of having a formal dysphagia program in improving adherence and patient outcomes.

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## Appendices

### Appendix A. AHA/ASA GWTG Stroke

#### AHA/ASA guideline for early management of patients with acute ischemic stroke

- Stroke as the 4<sup>th</sup> leading cause of death
- Class I recommendations demonstrate that benefits outweigh the risk and that the procedure or treatment should be performed or administered.
- A level of evidence B means that data was derived from a single randomized trial or nonrandomized studies and limited populations were evaluated. Despite this, there may be a very clear clinical consensus that the test or therapy is useful or effective.
- The use of standardized stroke care order sets is recommended to improve general management (Class I; Level of Evidence B)
- Assessment of swallowing before the patient begins eating, drinking or receiving oral medications is recommended (I-B)
- Patients who cannot take solid food and liquids should receive nasogastric , nasoduodenal or percutaneous endoscopic gastrostomy tube feedings to maintain hydration and nutrition while undergoing efforts to restore swallowing (I-B)
- 63% of patients develop at least one complication after acute stroke even when cared for in specialized units.
- Stroke-associated pneumonia increases length of stay, mortality and hospital costs.
- Impairments of swallowing are associated with a high risk of pneumonia. Patients with infarctions of the brain stem, multiple strokes, major hemispheric lesions or depressed consciousness are at greatest risk for aspiration.

Source: Jauch et al., 2013

## **Appendix B. ASHA Guideline**

The **American Speech-Hearing -Language Association (ASHA)** guideline defined swallowing screening as a pass/fail procedure to identify individuals who required a comprehensive assessment of swallowing function or a referral for other professional and /or medical services. Swallowing impairments may cause pulmonary aspiration, airway obstruction, or inadequate nutrition and /or hydration. Screening may result in recommendations for rescreening or comprehensive assessment of swallowing function, or in a referral for other examinations or services.

### **Clinical Indications**

Individuals of all ages are screened as needed, requested, or mandated or when other evidence (eg., neurological or structural deficits) suggests that they are at risk for a swallowing disorder involving body structure/function and/or activities/participation.

### **Clinical Process**

Screening services are sensitive to cultural and linguistic diversity. Screening may include the following:

- interview or questionnaire that addresses swallowing function.
- observation of the signs and symptoms of oropharyngeal swallowing dysfunction.
- observation of routine or planned feeding situation, if indicated.
- formulation of appropriate recommendations, including the need for a full swallow function assessment or evaluation.
- communication of results and recommendations to the team responsible for the individual's care.

Individuals who fail the screening are referred for a full swallow function assessment or evaluation by a speech-language pathologist and/or other medical services as appropriate.

### **Setting, Equipment Specifications, Safety and Health Precautions**

Setting: Screening is conducted in a clinical or natural environment conducive to obtaining valid screening results, which may include settings such as the bedside, home or hospice.

Patient/client positioning and comfort, functional competencies, and environmental distractors are observed during routine or planned oral intake/feeding.

Telehealth may be used, when appropriate, to overcome barriers to accessing service caused by distance, unavailability of specialists and subspecialists, or impaired mobility.

Equipment Specifications: All equipment is used and maintained in accordance with the manufacturer's specifications.

Safety and Health Precautions: All procedures ensure the safety of the patient/client and clinician and adhere to universal health precautions (eg., prevention of bodily injury and transmission of infectious disease). Decontamination, cleaning, disinfection, and sterilization of multiple-use equipment before reuse are carried out according to facility-specific infection control policies and procedures and according to manufacturer's instructions.



**Documentation**

Documentation includes a statement of identifying information, screening results, and recommendations, indicating the need for rescreening, assessment or referral.

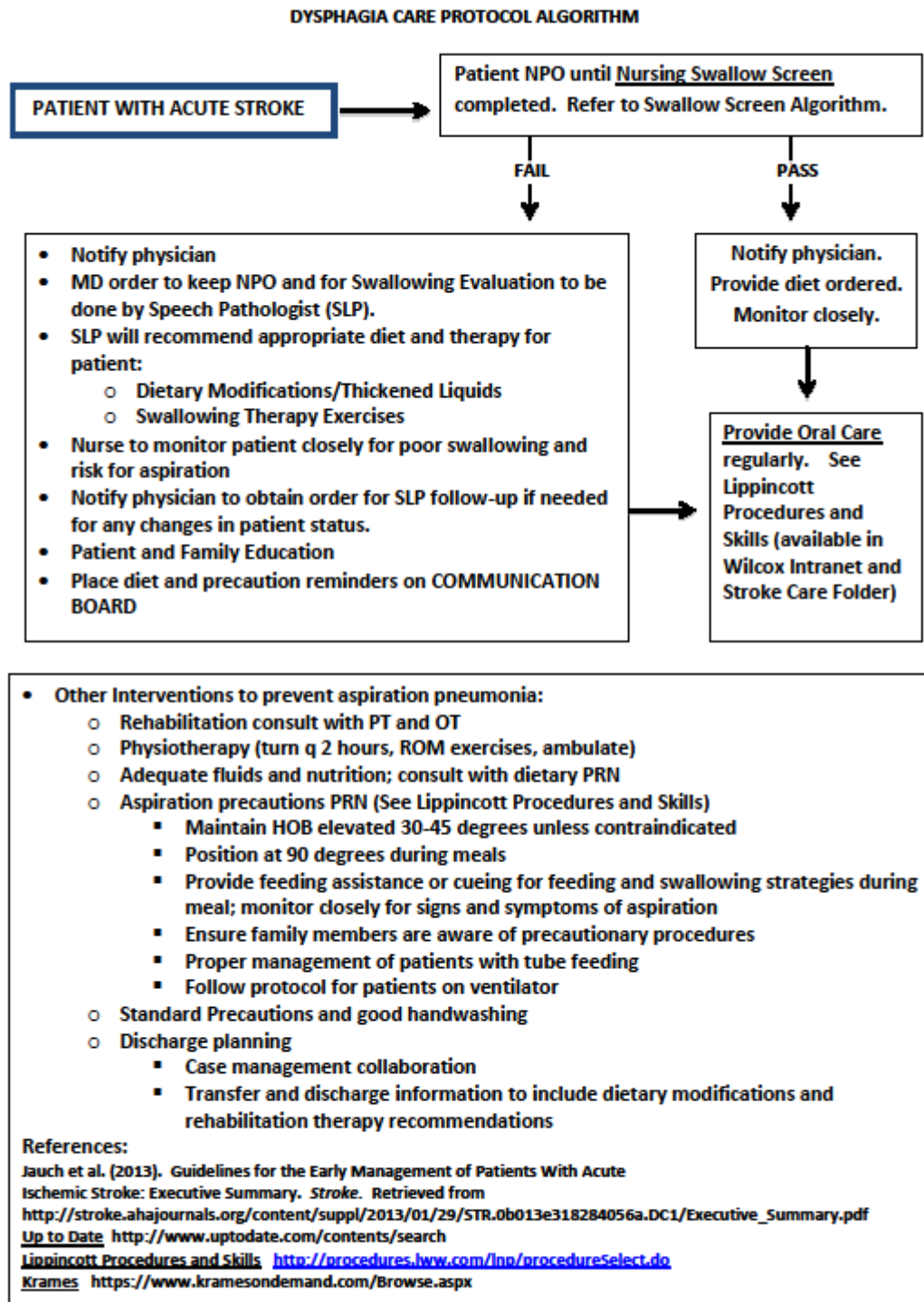
The privacy and security of documentation are maintained in compliance with the regulations of the Health Insurance Portability and Accountability Act (HIPAA) and the Family Educational Rights and Privacy Act (FERPA) and other state and federal laws.

Results of screening are reported to the individual and family/caregivers, as appropriate. Reports are distributed to referral source and other professionals when appropriate and with written consent.

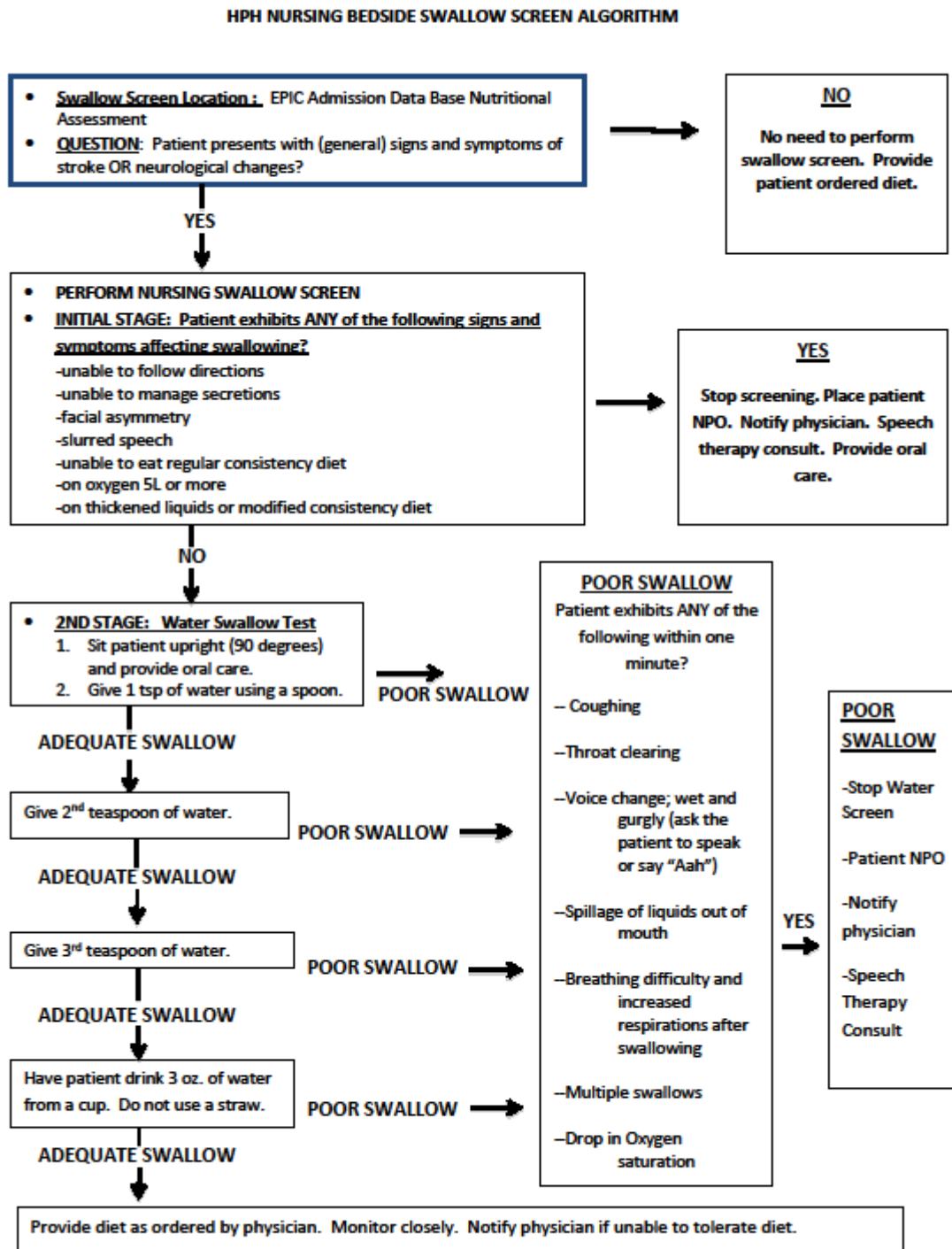
**Source:**

American Speech-Language-Hearing Association. (2004). *Preferred Practice Patterns for the Profession of Speech-Language Pathology* [Preferred Practice Patterns]. Available from [www.asha.org/policy](http://www.asha.org/policy).  
doi:10.1044/policy.PP2004-00191

## Appendix C. Dysphagia Care Algorithm



## Appendix D. HPH Nursing Swallow Screen Algorithm



## Appendix E. HLC Dysphagia Care Outline

# HLC Dysphagia Module

## Description:

The purpose of this course is to provide a module on dysphagia to all hospital nursing staff. This module will provide a brief overview of dysphagia/swallowing difficulty.

## Learning Objectives:

At the conclusion, participants should be able to:

- Describe and identify the signs/symptoms of dysphagia
- Provide education regarding screening patients for dysphagia using an evidence based screen and documenting the findings in Epic

## Course Outline:

1. The definition of dysphagia
2. The normal stages of swallowing (anatomy)
3. The Gag Reflex and Dysphagia
4. Signs/symptoms of dysphagia
5. Medical conditions and dysphagia
6. Consequences of Dysphagia
7. What is Aspiration
8. Dysphagia Management
  - a. The "Dysphagia Screen"
  - b. Team approach
  - c. Food/liquid consistency modification
  - d. Safe swallow guidelines
  - e. Dysphagia management and the Speech Pathologist
  - f. Swallowing and Quality of Life (Palliative Care)

## Catalog

This course belongs to the following categories in the HLC catalog:

- Nursing

Course Version: 1

Post-Test: 10 questions

Approximate time of online tutorial: 30 minutes

## Appendix F. Nursing Swallow Screen Skills Checklist

### **Nursing Swallow Screening Skills Checklist**

Date: \_\_\_\_\_

Examinee's Name and Title: \_\_\_\_\_

Evaluator's Name and Title: \_\_\_\_\_

#### **Before Procedure:**

1. Gather the appropriate equipment.
2. Perform hand hygiene.
3. Ensure comfort and privacy.
4. Confirm the patient's identity using at least two patient identifiers.
5. Explain the procedure to the patient.
6. Refer to the Nutritional Assessment Screen in the EPIC admission navigator.

#### **First Stage of Screening:**

7. Note if patient presents with (general) signs and symptoms of stroke or neuro changes.
8. If answer is YES to above, note the following signs and symptoms affecting swallowing:
  - Unable to follow directions
  - Unable to manage secretions (drooling)
  - Facial asymmetry
  - Slurred speech
  - Unable to eat regular consistency diet
  - On 5L of oxygen or more
  - On thickened liquids
9. If answer is YES to any of the above initial screening criteria, STOP screening and notify MD.
10. If answer is NO to any of the above initial screening criteria, proceed with water swallow test.

#### **Second Stage of Screening:**

11. Put on gloves and other personal protective equipment, as needed.
12. Assist the patient to an upright or sitting position at a 90 degree angle
13. Note whether the patient can maintain an upright posture and control his or her head and neck position.
14. If patient wears dentures, make sure they're properly in place before testing.
15. Remove dentures if poor fitting.
16. Provide oral care.

#### **Continued**

17. Give patient one teaspoon of water for 3 trials, then, have patient drink 3 oz. of water from a cup. If patient exhibits any of the following signs and symptoms at anytime during the test, STOP the test, keep patient NPO, notify MD and consult Speech Pathology.
  - Coughing
  - Throat clearing
  - Voice change (ask the patient to speak)
  - Spillage of liquids out of mouth
  - Breathing difficulty and increased respirations after swallowing

- Multiple swallows
  - Drop in oxygen saturation ( $\geq 2\%$ )
18. Suction liquid from the patient's mouth if necessary.
  19. Notify patient's practitioner of the test results.
  20. Remove and discard your gloves and other personal protective equipment if worn.
  21. Perform hand hygiene.
  22. Document the procedure.

Date: \_\_\_\_\_

Examinee's Name and Title: \_\_\_\_\_

Pass \_\_\_\_\_ Requires More Practice \_\_\_\_\_

Evaluator's Signature/ Title: \_\_\_\_\_

## **Appendix G. Annual Competency Fair Dysphagia Care Outline**

### **Nursing Swallow Screening Program**

#### **Background:**

According to a 2010 report from Hawai'i State Department of Health, Heart Disease and Stroke Prevention Program (HDSPP), the State of Hawai'i's age-adjusted stroke mortality rate of 40.2 exceeded the Healthy People 2020 goal of 33.8 per 100,000 residents. By County, the island of Kaua'i had the highest stroke mortality rate at 45.6 (Hawai'i State Department of Health, 2010). As a result, HDSPP's strategic plan included compliance with the American Heart Association and American Stroke Association Get-With-The-Guideline Stroke as research have shown that compliance with this evidence-based guideline has led to improved patient outcomes and cost savings (Hawai'i Department of Health, 2010).

In stroke patients, approximately half of those who develop dysphagia experience aspiration and one third of these patients develop pneumonia requiring treatment (Hinchey, Shepherd, Furie, Smith, Wang & Tonn, 2005). Proceeding from the International Stroke Conference stated that dysphagia screening is critical in preventing adverse outcomes related to aspiration and hydration/nutrition, and therefore, must be included in the care of post-stroke patients (Donovan et al., 2013).

#### **Learning Objectives:**

1. Describe and identify the signs and symptoms of dysphagia.
2. Explain the rationale for using a nursing swallow screening tool.
3. Differentiate between a swallow screening versus a swallow evaluation.
4. Utilize an evidence-based swallow screening tool approved by the institution.
5. Document findings of the swallow screening in the EPIC electronic medical record system.

#### **Teaching Plan:**

1. Poster presentation during the Annual Competency Fair.
2. Skills demonstration and practice of nursing swallow screening procedure
3. Skills check off to demonstrate proficiency in performing a nursing swallow screening.
4. Availability of nurse champions to serve as consult persons and staff support.
5. Completion of a nursing survey to evaluate nursing perceptions about swallow screening tool and procedure.

## **Appendix H. JCAHO PSC Requirements**

The Joint Commission's Primary Stroke Center Certification Program, launched in December 2003, was developed in collaboration with the American Heart Association/American Stroke Association (AHA/ASA). Currently, there are more than 1,000 certified primary stroke centers in 49 states plus Puerto Rico. Certification is available only to programs in Joint Commission-accredited acute care hospitals.

The Certificate of Distinction for Primary Stroke Centers recognizes centers that follow the best practices for stroke care. Applicants for advanced certification must meet the requirements for Disease-Specific Care Certification plus additional, clinically specific requirements and expectations. Certified primary stroke centers:

- Use a standardized method of delivering care
- Support patient self-management activities
- Tailor treatment and intervention to individual needs
- Promote the flow of patient information across settings and providers, while protecting patient rights, security and privacy
- Analyze and use standardized performance measure data to continually improve treatment plans
- Demonstrate their application of and compliance with clinical practice guidelines published by the [AHA/ASA](#) or equivalent evidence-based guidelines

### **Certification process**

On-site certification reviews are conducted by reviewers with expertise in stroke care. The certification decision is based on the evaluation of standards, implementation of clinical practice guidelines and performance measurement activities. Primary Stroke Centers that successfully demonstrate compliance in all three areas are awarded certification for a two-year period. At the end of the first year, the organization is required to participate in a conference call to attest to its continued compliance with the standards and to review performance improvement activities.

### **Standards**

The standards are published in the Comprehensive Certification Manual for Disease-Specific Care. They incorporate the “Recommendations for the Establishment of Primary Stroke Centers” developed by the Brain Attack Coalition. The chapters address:

- Program management
- Delivering or facilitating clinical care
- Supporting self-management



- Clinical information management
- Performance improvement and measurement

### **Performance measurement**

Certified primary stroke centers must collect and report on eight stroke core measures. Data can be self-submitted quarterly to The Joint Commission through a secure extranet site, or data can be submitted through a vendor. The eight stroke core measures (also approved as a core measure set for The Joint Commission's ORYX program) are:

- Venous thromboembolism (VTE) prophylaxis\*
- Discharged on antithrombotic therapy
- Anticoagulation therapy for atrial fibrillation/flutter
- Thrombolytic therapy\*
- Antithrombotic therapy by end of hospital day two
- Discharged on statin medication\*
- Stroke education\*
- Assessed for rehabilitation

### **Benefits of Joint Commission Certification**

- **Improves the quality of patient care by reducing variation in clinical processes** – The Joint Commission's standards and emphasis on clinical practice guidelines help organizations establish a consistent approach to care, reducing the risk of error.
- **Provides a framework for program structure and management** – Certification standards help organize the disease management program. This helps to maintain a consistently high level of quality, using effective data-driven performance improvement.
- **Provides an objective assessment of clinical excellence** – Joint Commission reviewers have significant experience evaluating disease management programs. They are trained to provide expert advice and education on good practices during the on-site review.
- **Creates a loyal, cohesive clinical team** – Certification provides an opportunity for staff to develop their skills and knowledge. Achieving certification provides the clinical team with common goals and a concrete validation of their combined efforts.

- **Promotes a culture of excellence across the organization** – Meeting Joint Commission standards is an accomplishment recognized with the awarding of The Joint Commission's Gold Seal of Approval™. Certified organizations proudly display the Gold Seal to advertise their commitment to health care quality.
- **Facilitates marketing, contracting and reimbursement** – Certification may provide an advantage in a competitive health care marketplace and improve the ability to secure new business.
- **Strengthens community confidence in the quality and safety of care, treatment, and services** – Achieving certification makes a strong statement to the community about an organization's efforts to provide the highest quality services.
- **Recognized by select insurers and other third parties** – In some markets, certification is becoming a prerequisite to eligibility for insurance reimbursement, or participation for managed care plans and contract bidding.
- **Can fulfill regulatory requirements in select states** – Certification may meet certain regulatory requirements in some states, which can reduce duplication on the part of certified organizations.

**Source:**

[http://www.jointcommission.org/facts\\_about\\_primary\\_stroke\\_center\\_certification/](http://www.jointcommission.org/facts_about_primary_stroke_center_certification/)

[http://www.jointcommission.org/benefits\\_of\\_joint\\_commission\\_certification/](http://www.jointcommission.org/benefits_of_joint_commission_certification/)

## **Appendix I. Nursing Swallow Screen Survey**

Thank you for participating in this survey.

1. Are you familiar with the current guidelines on how to prevent aspiration pneumonia in stroke patients?
  - a. Not familiar at all
  - b. Slightly familiar
  - c. Somewhat familiar
  - d. Quite familiar
  - e. Very familiar
2. How confident are you in your ability to conduct a bedside swallowing screen?
  - a. Not confident at all
  - b. Slightly confident
  - c. Somewhat confident
  - d. Quite confident
  - e. Very confident
3. Have you received training on how to conduct a bedside swallow screen?
  - a. Yes
  - b. No
4. Are you familiar with the nursing swallow screening tool in the EPIC admission data base?
  - a. Not familiar at all
  - b. Slightly familiar
  - c. Somewhat familiar
  - d. Quite familiar
  - e. Very familiar
5. Have you used the nursing EPIC swallowing screening tool?
  - a. Yes
  - b. No
6. What department do you currently work in?

Comments/Suggestions:

## Appendix J. HCAHPS Survey Questions

### HCAHPS Survey Questions

The information below is available on the *Hospital Compare* website. For more information, go to [www.hospitalcompare.hhs.gov](http://www.hospitalcompare.hhs.gov) and click on “Data Details.”

The HCAHPS survey asks patients to give feedback about topics for which they are the best source of information. The survey asks patients to answer questions about their experiences in the hospital. To make sure the HCAHPS survey data is meaningful; patients only answer questions about topics with which they have experience.

The HCAHPS survey asks patients to answer questions related to ten topics. The topics and questions are listed in the table below.

<b>How often did nurses communicate well with patients?</b>
During this hospital stay...
<ul style="list-style-type: none"><li>• how often did nurses treat you with courtesy and respect? (Q1)</li><li>• how often did nurses listen carefully to you? (Q2)</li><li>• how often did nurses explain things in a way you could understand? (Q3)</li></ul>
<b>How often did doctors communicate well with patients?</b>
During this hospital stay...
<ul style="list-style-type: none"><li>• how often did doctors treat you with courtesy and respect? (Q5)</li><li>• how often did doctors listen carefully to you? (Q6)</li><li>• how often did doctors explain things in a way you could understand? (Q7)</li></ul>
<b>How often did patients receive help quickly from hospital staff?</b>
<ul style="list-style-type: none"><li>• During this hospital stay, after you pressed the call button, how often did you get help as soon as you wanted it? (Q4)</li><li>• How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted? (Q11)</li></ul>
<b>How often was patients' pain well controlled?</b>
During this hospital stay...
<ul style="list-style-type: none"><li>• how often was your pain well controlled? (Q13)</li><li>• how often did the hospital staff do everything they could to help you with your pain? (Q14)</li></ul>

## Appendix K. Wilcox Hospital HCAHPS Composites Summary

### Wilcox Memorial Hospital HCAHPS Composites Summary

Based on surveys received from 7/1/2014 - 6/30/2015

The numbers reflect Top Box scores (%9-10, always)

\*NOTE: Includes the following stroke-related DRG codes: 060 - 069

HCAHPS COMPOSITES MEASURES	Stroke DRGs* n=28	All of WMH n=738	Top Box needed for 75th percentile	Top Box needed for 90th percentile
Overall rating	77.8	76.3	77.6	80.8
Nurse communication	82.1	84.4	83.3	85.4
Responsiveness of staff	75.7	74.3	72.0	76.3
Physician communication	89.3	87.4	83.9	86.7
Cleanliness of hospital environment	82.1	82.2	77.8	81.6
Quietness of hospital	64.3	65.3	67.8	73.3
Pain management	81.2	74.5	75.7	77.9
Communication about medications	55.0	66.9	68.2	72.1
Discharge information	92.4	86.5	88.7	90.5
Care Transition Composite	60.7	58.8	56.1	60.3
# Composites at 90th percentile	4	2		

DATA SOURCE: Press Ganey InfoEDGE  
Data ran on 9/18/2015

## Appendix L. Stroke Clinical Pathway

PLAN OF CARE	PREADMIT	INPATIENT CARE (per physician orders) Day 1	Day 2	Day 3	Additional Day
<b>DIAGNOSTIC TESTS</b>	<ul style="list-style-type: none"> <li>•CBG</li> <li>•Head CT</li> <li>•CBC + PLT w/ Diff, PT/INR, APTT, BMP, Troponin I</li> <li>•MRI</li> <li>•ECG</li> <li>•HCG (females)</li> <li>•Pulse Ox</li> </ul>	<ul style="list-style-type: none"> <li>•CBC, PT/INR, APTT, Serum chemistries, ABGs, Lipid profile, Pulse Ox q 4H (as needed), Urinalysis, Chest x-ray, CT scan of head, Echocardiography &amp; carotid Doppler, ECG</li> </ul>	<ul style="list-style-type: none"> <li>• CBC, PT/INR, APTT, Serum albumin, Pulse Ox q 8H (as needed), Cerebral arteriogram</li> </ul>	<ul style="list-style-type: none"> <li>• CBC, PT/INR, APTT, Serum Albumin, Pulse Ox q 12H (as needed)</li> </ul>	<ul style="list-style-type: none"> <li>•CBC, PT/INR, APTT, Serum Albumin, Pulse Ox (as needed)</li> </ul>
<b>MEDICATIONS</b>	<ul style="list-style-type: none"> <li>•Perform swallow screen prior to giving any PO meds</li> <li>•ASA</li> <li>•Antihypertensives: ACE Inhibitors, beta-blockers, Calcium Channel blockers</li> <li>•Anticoagulants: heparin or enoxaparin</li> <li>•Antiplatelet: Plavix</li> <li>•Antilipid: Lipitor</li> <li>•Diuretics: Lasix, Bumex, mannitol</li> <li>•Analgesics</li> <li>•Anticonvulsants: clonazepam, phenytoin</li> <li>•IV: 0.9% sodium chloride</li> <li>•Consider rtPA</li> </ul>	<ul style="list-style-type: none"> <li>•Verify swallow screen completed</li> <li>•ASA</li> <li>•Antihypertensives</li> <li>•Anticoagulants</li> <li>•Antiplatelet</li> <li>•Antilipid</li> <li>•Diuretics</li> <li>•Analgesics</li> <li>•Anticonvulsants</li> <li>•Stool softeners</li> <li>•IV: 0.9% sodium chloride</li> </ul>	<ul style="list-style-type: none"> <li>•ASA</li> <li>•Antihypertensives</li> <li>•Antiplatelet</li> <li>•Antilipid</li> <li>•Anticoagulants: heparin or enoxaparin</li> <li>•Diuretics</li> <li>•Analgesics</li> <li>•Anticonvulsants: clonazepam, phenytoin</li> <li>•Stool softeners</li> <li>• IV: 0.9% sodium chloride</li> </ul>	<ul style="list-style-type: none"> <li>• ASA</li> <li>• Antihypertensives</li> <li>• Anticoagulants: start warfarin (Coumadin)</li> <li>• Antiplatelet</li> <li>• Antilipid</li> <li>• Diuretics</li> <li>• Analgesics</li> <li>• Anticonvulsants</li> <li>• Stool softeners</li> <li>• Saline or heparin lock IV</li> </ul>	<ul style="list-style-type: none"> <li>• ASA</li> <li>• Antihypertensives</li> <li>• Anticoagulants</li> <li>• Diuretics</li> <li>• Analgesics</li> <li>• Anticonvulsants</li> <li>• Stool softeners</li> </ul>
<b>PROCEDURES</b>	<ul style="list-style-type: none"> <li>•Establish IV access</li> <li>•Obtain baseline physical &amp; neurological assessment (w/i 10 mins of arrival)</li> <li>•Neuro consult</li> <li>•NIHSS w/i 25 mins of arrival</li> </ul>	<ul style="list-style-type: none"> <li>•Check VS q4hr and as needed</li> <li>•Place on O<sub>2</sub>, if needed to maintain O<sub>2</sub> Sat of &gt;94%</li> <li>•Neuro check q2hr</li> <li>•VTE/SCD</li> <li>•Seizure precautions</li> <li>•Protect patient from injury/fall</li> <li>•Maintain airway, suction as needed</li> <li>•Prevent aspiration</li> <li>•Assess for changes in heart sounds and rhythm</li> <li>•Assess for bleeding and for signs of increasing ICP</li> <li>•Full assessment q shift</li> </ul>	<ul style="list-style-type: none"> <li>•Check VS q4hr and as needed</li> <li>•D/C O<sub>2</sub> if O<sub>2</sub> Sat &gt;94% on room air</li> <li>•Neuro check q4hr</li> <li>•VTE/SCD</li> <li>•Seizure precautions</li> <li>•Protect patient from injury/fall</li> <li>•Maintain airway, suction as needed</li> <li>•Prevent aspiration</li> <li>•Assess for changes in heart sounds and rhythm</li> <li>• Assess for bleeding and for signs of increasing ICP</li> <li>• Full assessment q shift</li> </ul>	<ul style="list-style-type: none"> <li>• Same as previous day</li> </ul>	<ul style="list-style-type: none"> <li>•Same as previous day</li> </ul>

<b>DIET</b>	<ul style="list-style-type: none"> <li>• Obtain baseline nutritional and hydration needs</li> </ul>	<ul style="list-style-type: none"> <li>• NPO if swallow screen failed or not completed</li> <li>• Request speech therapy consult, if swallow screen failed</li> <li>• Request nutrition consult, if applicable</li> </ul>	<ul style="list-style-type: none"> <li>• Assess need for TPN and enteral feeds for NPO patient</li> <li>• Follow diet as ordered</li> <li>• Thicken liquids, as requests</li> <li>• Assist w/ medications</li> <li>• Keep head elevated and tilt head slightly forward when eating</li> <li>• Teach patient to eat small, frequent meals</li> </ul>	<ul style="list-style-type: none"> <li>• Advance diet as tolerated (DAT)</li> <li>• Assist w/ meals</li> <li>• Keep head elevated and tilt head slightly forward when eating</li> </ul>	<ul style="list-style-type: none"> <li>• Advance diet as tolerated (DAT)</li> <li>• Assist w/ meals</li> <li>• Keep head elevated and tilt head slightly forward when eating</li> <li>• Consider PEG tube, if necessary</li> </ul>
<b>ACTIVITY</b>	<ul style="list-style-type: none"> <li>• Assess ability to perform ADLs</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Assess safety needs</li> <li>• Bedrest, if ordered with HOB at 30 degrees</li> <li>• Ambulate or OOB, if ordered as tolerated</li> <li>• Turn and position q2hr</li> <li>• ROM exercises</li> <li>• PT and OT consults</li> </ul>	<ul style="list-style-type: none"> <li>• Assess safety needs and provide appropriate measures</li> <li>• Turn and position patient q 2 hr</li> <li>• Have patient perform ROM to extremities</li> <li>• Have patient get up in chair b.i.d. if tolerated</li> <li>• Have patient begin walking, w/ PT</li> <li>• Praise activities and tasks accomplished</li> </ul>	<ul style="list-style-type: none"> <li>• Assess safety needs and provide appropriate measures</li> <li>• Turn and position patient q 2 hr</li> <li>• Have patient perform ROM to extremities</li> <li>• Have patient get up in chair t.i.d. if tolerated</li> <li>• Have patient walk w/ PT b.i.d.</li> <li>• Praise activities and tasks accomplished</li> </ul>	<ul style="list-style-type: none"> <li>• Assess safety needs and provide appropriate measures</li> <li>• Turn and position patient q 2 hr</li> <li>• Have patient perform ROM to extremities</li> <li>• Have patient get up in chair t.i.d. and as needed</li> <li>• Have patient walk w/ PT t.i.d.</li> <li>• Praise activities and tasks accomplished</li> </ul>
<b>ELIMINATION</b>	<ul style="list-style-type: none"> <li>• Take baseline assessment of urine and bowel patterns of elimination</li> </ul>	<ul style="list-style-type: none"> <li>• Measure I&amp;O</li> <li>• Assess bowel elimination &amp; urinary voiding</li> <li>• Assess bowel sounds</li> <li>• Observe for presence of constipation and paralytic ileus</li> </ul>	<ul style="list-style-type: none"> <li>• Measure I&amp;O</li> <li>• Assess bowel elimination &amp; urinary voiding</li> <li>• Assess bowel sounds</li> <li>• Observe for presence of constipation and paralytic ileus</li> <li>• Begin bladder training</li> <li>• D/C indwelling catheter, if in place</li> </ul>	<ul style="list-style-type: none"> <li>• Measure I&amp;O</li> <li>• Assess bowel elimination &amp; urinary voiding</li> <li>• Assess bowel sounds</li> <li>• Observe for presence of constipation and paralytic ileus</li> <li>• Continue bladder training</li> </ul>	<ul style="list-style-type: none"> <li>• Assess bowel elimination &amp; urinary voiding</li> <li>• Continue bladder training</li> </ul>
<b>HYGIENE</b>	<ul style="list-style-type: none"> <li>• Take baseline skin assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Keep skin clean and dry</li> <li>• Protect skin from breakdown</li> <li>• Provide oral hygiene q.i.d.</li> <li>• Assist w/ care, as needed</li> </ul>	<ul style="list-style-type: none"> <li>• Keep skin clean and dry</li> <li>• Protect skin from breakdown</li> <li>• Provide or assist with oral hygiene before &amp; after meals</li> <li>• Encourage as much self-care as possible</li> </ul>	<ul style="list-style-type: none"> <li>• Keep skin clean and dry</li> <li>• Protect skin from breakdown</li> <li>• Provide or assist with oral hygiene before &amp; after meals</li> <li>• Encourage as much self-care as possible</li> </ul>	<ul style="list-style-type: none"> <li>• Keep skin clean and dry</li> <li>• Protect skin from breakdown</li> <li>• Provide or assist with oral hygiene before &amp; after meals</li> <li>• Encourage as much self-care as possible</li> </ul>
<b>PATIENT</b>	<ul style="list-style-type: none"> <li>• Teach about</li> </ul>	<ul style="list-style-type: none"> <li>• Orient patient to</li> </ul>	<ul style="list-style-type: none"> <li>• Reorient patient</li> </ul>	<ul style="list-style-type: none"> <li>• Repeat previous</li> </ul>	<ul style="list-style-type: none"> <li>• Reinforce previous</li> </ul>

<b>T E A C H I N G</b>  <b>**DOCUMENT WHAT YOU TEACH IN EPIC**</b>	procedures and plan •Teach need for inpatient treatment	environment •Prepare for diagnostic tests •Give brief, simple instruction related to care •Include family/care givers in care as appropriate	to environment • Educate about diagnosis • Begin teaching r/t ADL training • Evaluate understanding of teaching using teachback method • Instruct in use of assistive devices for communication, eating and walking • Teach transfer techniques	teaching • Teach lifestyle modification (diet, exercise, smoking cessation) • Teach importance of BP monitoring • Teach about medications: name, route, dosage, time action, side effects • Teach safety precautions r/t anticoagulant therapy	teaching •Give specific verbal and written discharge instructions <ul style="list-style-type: none"> <li>○ Activation of EMS</li> <li>○ Follow-up</li> <li>○ Medications risk factors (med rec completed)</li> <li>○ Warning S&amp;Sx of stroke</li> </ul> •Teach importance of follow-up care
<b>DISCHARGE PLANNING</b>		•Assess discharge needs/barriers to discharge	• Arrange for home health care, and home durable medical equipment, if needed • Make referrals to SNF/LTC facilities if appropriate • Reevaluate progress toward discharge goals	• Reevaluate home care requirements • Reevaluate progress toward discharge goals • Follow up on home health referrals and SNF/LTC referrals. • Confer with MD to get an anticipated d/c date. • Inform SNF/LTC facilities and home health agencies of anticipated d/c date.	•Reevaluate progress toward discharge goals

#### What to look for, physical findings:

Cardiovascular: hypertension, tachycardia, carotid bruit

Gastrointestinal: loss of gag reflex, bowel incontinence, decreased or absent bowel sounds, dysphagia

General: emotional lability, lethargy, apathy or combativeness, fever

Neurological: contralateral motor and sensory deficits, including weakness, paresis, paralysis, anesthesia, unequal pupils, unequal hand grasps, akinesia, aphasia (expressive, receptive or global), agnosias, apraxia, visual deficits, perceptual or spatial disturbances, altered level of consciousness (drowsiness to deep coma), positive Babinski sign, decreased followed by increased deep tendon reflexes, flaccidity followed by spasticity, amnesia, ataxia, personality change, nuchal rigidity, seizures

Respiratory: loss of cough reflex, labored or irregular respirations, tachypnea, rhonchi, airway occlusion, apnea

Urinary: incontinence or retention

**Related Nursing Diagnoses:** impaired physical mobility, risk for injury, impaired verbal communication, self-care deficit (bathing/hygiene, feeding, dressing/grooming or toileting), sensory/perceptual alteration (visual, auditory, kinesthetic, gustatory, tactile or olfactory), altered urinary elimination, constipation, altered nutrition: less than body requirements, impaired swallowing, ineffective breathing pattern, self-esteem disturbance, ineffective management of therapeutic regimen (community, family or individual)

**Potential complications:** aspiration, injury, increased ICP, seizure

Related videos for patient and family/identified care taker to watch on Lodgenet:

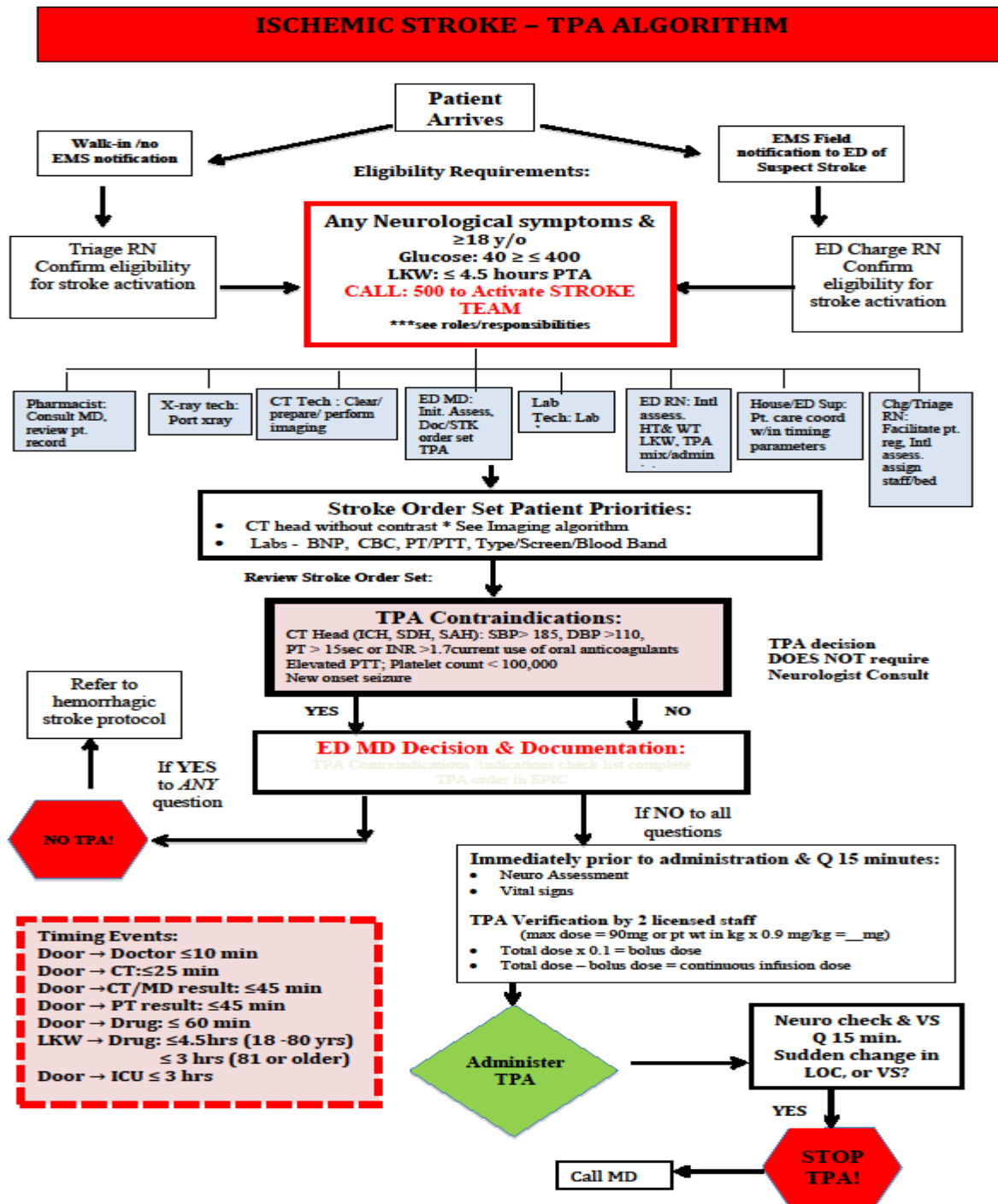
**Main Menu**

Welcome Video

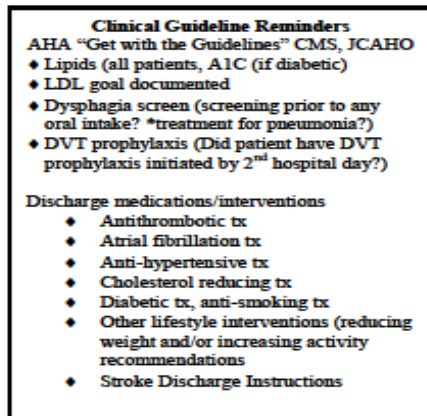
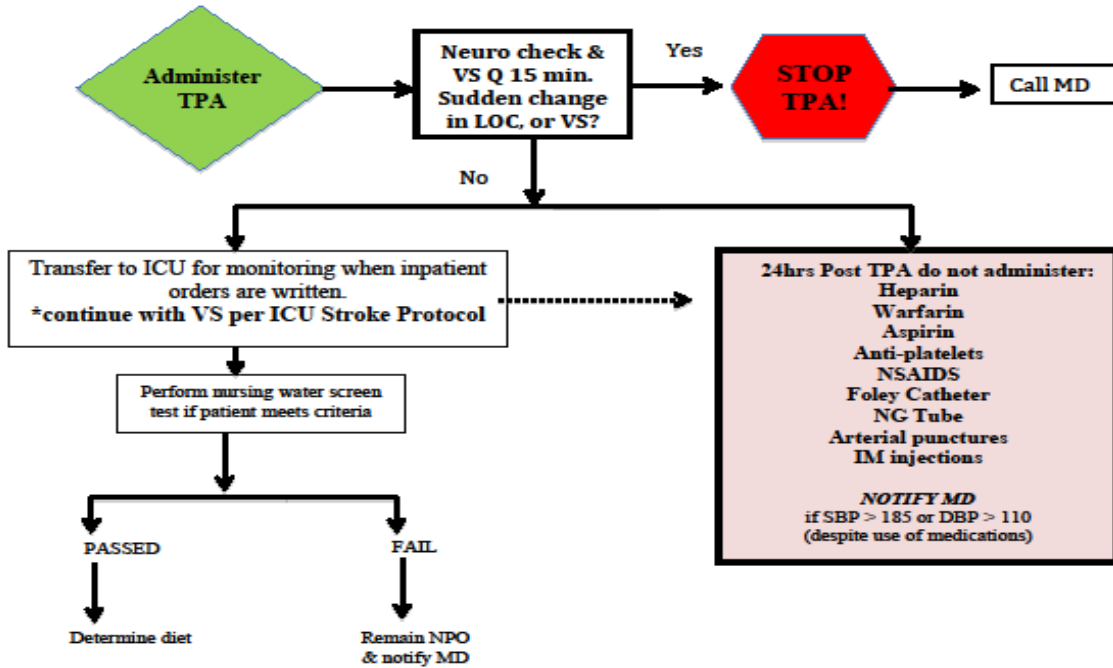
**Patient Education**



## Appendix M. WMH Stroke Code Algorithm



## ISCHEMIC STROKE – TPA ALGORITHM



### Imaging Ischemic Stroke Algorithm

